



# SUPPLEMENT TO The Calcutta Gazette.

WEDNESDAY, JANUARY 1, 1868.

## OFFICIAL PAPERS.

Subscribers to the GAZETTE may receive the SUPPLEMENT separately on a payment of six Rupees per annum if delivered in Calcutta, or twelve Rupees if sent by Post.

### The License Tax.

PAYMENT of amount collected under Act XXI. of 1867 in the Lower Provinces.

	PRESIDENCY.			MADRAS.		TOTAL	
	Before reported.	FOR THE WEEK ENDING		Reported to close of October 1867.	For November 1867.		
		7th Dec.	14th Dec.				
... ...	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	
... ...	4,33,935 9 5	4,007 4 0	2,548 8 0	8,13,562 0 0	29,252 0 0	12,85 5 5	
... ...	14,208 5 7	84 0 0	1,440 0 0	13,008 0 0	1,050 0 0	3,7 5 7	
... ...	4,19,777 3 10	3,923 4 0	1,108 8 0	8,00,554 0 0	28,202 0 0	12,53,564 15 10	
... ...	27,120 0 0	.....	.....	.....	.....	27,120 0 0	
... Presi- ... Govt. of India ... Examiner ... salaries } ... ... Govt. of Bengal ... Treasuries ... ...	23,920 0 0	.....	.....	69,692 0 0	.....	93,920 0 0	
... ...	.....	.....	.....	.....	.....	69,692 0 0	
... ...	.....	.....	.....	.....	.....	12,040 0 0	
... ...	.....	.....	.....	.....	.....	19,251 10 8	
Grand Total	4,70,817 3 10	3,923 4 0	1,108 8 0	8,70,246 0 0	28,202 0 0		

the 24th of Dec.

Results of the Meteorological Observations taken at the Survey Office, Calcutta, from 15th to 21st December 1867.

Month.	Date.	Reduced Reading of Barometer at 10 a. m. Inches.	THERMOMETER.			Daily Range of the Temperature.	Mean Temperature for the day.	Computed Dew-point.	Mean Degree of humidity for the day.	Prevailing Direction of Wind during the day.	Rain. Inches	Max. Pressure of Wind. lb.	Remarks.
			Highest Reading. O	Lowest Reading. O	Daily Range of the Temperature. O								
Dec.	15th	30.110	75.0	61.0	14.0	67.7	61.8	57.1	0.70	NNW & NW	... ... ...	Chiefly clear P. M.	
	16th	30.179	74.6	60.0	14.6	67.4	62.4	58.4	.74	NW & N	... ... ...	Chiefly clear.	
	17th	30.169	78.2	62.0	16.2	69.1	63.3	58.7	.71	N & N NS	... ... ...	Chiefly clear.	
	18th	30.171	76.5	61.5	15.0	68.7	63.1	58.6	.73	N	... ... ...	Clear.	
	19th	30.148	77.0	60.5	16.5	68.3	62.6	58.0	.71	N	... ... ...	Clear.	
	20th	30.126	75.8	60.2	15.6	67.7	61.4	56.4	.69	N	... ... ...	Clear.	
	21st	30.107	75.4	60.0	15.4	67.0	60.1	54.6	.68	N	... ... ...	Clear.	

The mean Temperature and the mean Wet Bulb are derived from the twenty-  
Observations made during the day.

The Dew-point is computed with the Greenwich constants. The figures in column ten represent the relative humidity of the air, the complete saturation of which being taken at unity. The receiver rain gauge is 1 foot 2 inches, and that of the Anemometer 70 feet 10 inches above the ground.

The extreme variation of Temperature during the past seven days	...	...
The Max. Temperature during the past seven days	...	...
The Max. Temperature during the corresponding period of the past year	...	...
The mean humidity during the past seven days	...	...
The mean humidity during the corresponding period of the past year	...	...
The total fall of rain from 15th to 21st ... { by lower rain-gauge	...	...
	by Anemometer gauge	...
Ditto ditto from 15th to 21st, average of thirteen previous years	...	0
Ditto ditto between the 1st January and the 21st current	...	7
Ditto ditto during the corresponding period of the past year	...	6

GOPENNAUTH SK

The 24th December 1867.

In charge of the Observatory



[ 3 ]

# SUPPLEMENT TO THE CALCUTTA GAZETTE.

WEDNESDAY, JANUARY 8, 1868.

## OFFICIAL PAPERS.

Subscribers to the GAZETTE may receive the SUPPLEMENT separately on a payment of six Rupees per annum if delivered in Calcutta, or twelve Rupees if sent by Post.

### Report on the Cultivation of Cinchona at Darjeeling, during the month of September 1867.

(Mr. A. H. DODSON, Esq., M. D., Superintendent, Botanical Gardens, and in charge of Cinchona Cultivation in Bengal, to the Junior Secretary to the Government of Bengal,—(No. 101, dated Botanical Gardens, the 16th December 1867.)

I HAVE the honor to forward the Report on the cultivation of Cinchona at Darjeeling, during the month of September 1867.

*on the cultivation of Cinchona at Darjeeling, during the month of September 1867.*

10,000 plants of Cinchona were planted in the open air plantations in the ground that was prepared during August. 60,000 of these plants belongs to the *Red bark*, and 31,000 to the *Crown bark*. The remaining 510 plants consisted of *C. Micrantha* and *C. Siccirubra*. 47,000 plants of *C. Siccirubra* and 50,000 of *C. Officinalis* were planted in open air. The stock plants of *C. Calisaya* were increased by the addition of 225 plants. This is growing with great luxuriance on northern, well drained slopes at 2,000 and above the sea. 81,000 cuttings were made during the month.

The weather during September was most favorable for vegetation; abundance of rain fell during the month (the amount of rain during the month was 29.7 inches) but there were frequent sunny intervals. Every endeavour was used to keep the plantations free from long grass as nothing conduces more to the healthy growth of Cinchonas than free air and light and frequent light hoeing of the soil near the roots of the plants. The number of plants in all stages of growth on the 30th September was 1,233,258 of which 47 were in permanent open air plantations, covering an area of about 350 acres.

Table shewing the temperature of the month at the different plantations.

PLANTATION.	Mean Maximum.	Mean Minimum.	Mean Temperature.	REMARKS.
... ...	69.4	62.3	65.8	
... ...	72.4	64.1	68.2	
... ...	81.8	64.1	72.9	
... ...	88.0	69.1	78.5	

Table showing the maximum and minimum growth during mon.

NAMES OF SPECIES.	TEESTA.		RUNGBEE.	
	First Plantation.	Second Plantation.	Third Plantation.	Fourth Plantation.
C. Succirubra ..	3½ to 6½ ins.	2½ to 6 ins.	Not measured.	1 to 5½ ins.
C. Micrantha ..	2½ to 8 "	4 to 9 "	Ditto.	5½ to 8 "
C. Officinalis ..	Not measured.	Not measured.	½ to 4 inches.	½ to 6½ "
C. Pahudiana ..	Ditto.	Ditto.	Not measured.	1½ "

Number and Distribution of Cinchona Plants in the Government Plantations at R.  
1st October 1867.

NAMES OF SPECIES OF CINCHONA.		Number in permanent Plantations.	Number of stock plants for propagation.	Number of seedlings or rooted cuttings in Nursery Beds for permanent Plantations.	Number of rooted plants in Cutting Beds.	Number of cuttings made during the month.
C. Succirubra ..	..	2,50,828	20,000	1,15,210	1,44,099	59,200
C. Calisaya ..	..	150	1,800	None.	4,504	1,800
C. Micrantha ..	..	5,558	1,000	7,120	16,989	None.
C. Officinalis and Varieties ..	..	1,30,919	10,000	1,58,476	2,80,513	20,000
C. Pahudiana ..	..	5,092	None.	None.	None.	None.
Total ..	..	3,92,547	32,800	2,80,806	4,46,105	81,000

J. GAMMIE,

Head Gardener in C

T. ANDERSON,

*Superintendent of the Botanical Gardens,  
and in charge of Cinchona Cultivation in Bengal.*

Results of the Meteorological Observations taken at the Survey Office, Calcutta, from 22nd to 31st December 1867.

MONTH.	Date,	Reduced Reading of Barometer at 10 A.M.	THERMOMETER.		Daily Range of the Temperature.	Mean Temperature for the day.	Mean Wet Bulb.	Computed Mean Dew-point.	Mean Degree of humidity for the day.	Prevailing Direction of Wind during the day.	Rain.	Inches.	Ib.	Max. Pressure of Wind.	GEN
			Highest Reading.	Lowest Reading.											
Dec.	22nd	30°134	76°7	69°2	17°5	66.8	69°5	55°5	0°60	N	..	..	..	Clear. P. M.	
	23rd	777	75°2	66°0	15°2	66°9	61°0	56°3	7°0	N	..	..	..	Clear. midnight from	
	24th	180	75°5	59°0	16°5	66°6	60.2	55°1	6°8	N	..	..	..	Scattered.	
	25th	151	73°5	60°6	13°0	66°3	60°6	56°0	7°1	N	..	..	..	and Cloudy.	
	26th	137	70°4	60°0	16°4	67°8	61°8	57°0	7°0	N	..	..	..	Chiefly cloudy	
	27th	121	78°2	62°0	16°2	70°1	64°4	59°8	7°1	N	..	..	..	from S. midning.	
	28th	153	78°0	62°5	15°5	69°6	63°0	57°7	6°8	N E	..	..	..	Clear.	
	29th	157	75°5	61°4	14°1	68°1	62°1	57°3	7°0	N E	..	..	..	Chiefly cloudy	
	30th	180	74°7	60°0	14°7	66°8	60°7	55°8	6°9	N	..	..	..	at 7 a.m.	
	31st	144	73°4	58.5	14°9	66°0	60°9	56°8	7°4	N	..	..	..	Chiefly cloudy	7

The mean Temperature and the mean Wet Bulb are derived from the t w  
Observations made during the day. The figures in column 3

The Dew-point is computed with the Greenwich constants. The figures in column humidity of the air, the complete saturation of which being taken at unity. The rain gauge is 1 foot 2 inches, and that of the Anemometer 70 feet 10 inches above ground.

The extreme variation of Temperature during the past ten days ...

The Max. Temperature during the past ten days

The Max. Temperature during the past ten days  
The Max. Temperature during the corresponding period of the past year...

The Max. Temperature during the corresponding period of the past ten days

The mean humidity during the corresponding period of the past year ...

Ditto ditto from 22nd to 31st, average of thirteen previous years

Ditto ditto from 22nd to 31st, average of thirteen years  
Ditto ditto between the 1st January and the 31st ultimo

Ditto ditto between the 1st January and the 31st December  
Ditto ditto during the corresponding period of the past year ...

GOPEENAUT

The 4th January 1868.

*In charge of the C*

Meteorological Report up to 21st December 1867.

Hour.	Barometer reduced to 30°.	THERMOMETER.			WIND.	Rain.	WEATHER.
		Dry.	Wet.	Humidity Sat. = 100.			
10	29°92	62	65	N N W N W N W	...	...	Clear.
10	29°107	70	62	61	...	...	Cirrostrati round the horizon.
16	29°98	74	63	51	N N E	...	Clear.
9-30	29°072	68	64	79	N N E	...	Scattered cumuli.
16	29°980	76	70	72	N N E	...	Clear.
9-30	29°124	67	64	84	N W by N	Light	Ditto.
16	29°035	74	63	63	N W by N	Light	Ditto.
9-30	30°106	70	64	70	N by E	Light	Ditto.
16	30°040	76	67	60	N by W	Light	Ditto.
9-30	30°055	69	65	79	N	Light	Ditto.
16	30°010	76	66	56	N	Light	Ditto.
9-30	30°032	70	65	75	N by W	Light	Ditto.
16	30°000	76	67	60	N	Moderate	Ditto.
9-30	30°129	69	65	79	N	Light	Ditto.
16	29°933	75	66	59	N by W	Light	Ditto.
9-30	29°052	67	61	69	N by E	Light	Partial cloudy.
16	29°965	75	65	56	N	Light	Clear.
9-30	29°987	68	66	80	K	Light	Scattered cumuli.
16	29°898	70	67	84	S W	Light	Cumuli strati towards N. E.
9-30	30°007	67	64	84	N by E	Light	Hazy.
A	29°929	70	67	84	W by S	Light	Cumuli.
9-30	30°012	65	63	89	N	Light	Clear.
16	29°906	71	68	85	W S W	Light	Cumuli towards E.
9-30	30°034	68	66	89	N	Light	Cirri to stratus.
16	29°926	71	69	89	S W by W	Light	Heavy towards N. and E. and S. E.
9-30	29°989	70	67	84	N by W	Light	Cumuli towards E.
16	29°901	72	68	80	S	Light	Cloudy horizon.
9-30	29°944	68	64	79	N	Light	Cirrocumuli.
16	29°869	70	66	79	S W	Light	Very heavy towards E. and S. E., threatening since noon.
9-30	29°041	66	63	83	N by E	Light	Clear.
16	29°849	69	67	89	W S W	Light	Ditto.
9-30	30°048	70	68	89	N E	Light	Fine and pleasant.
16	29°930	77	76	95	W	Light	Ditto ditto.
9-30	30°088	71	67	80	N E	Light	Ditto ditto.
16	29°860	77	70	68	W	Light	Ditto ditto.
9-30	30°091	69	67	89	N E	Light	Ditto ditto.
16	30°017	78	72	73	W	Light	Ditto ditto.
9-30	30°103	71	68	85	N E	Light	Ditto ditto.
		69	72	72	N E	Light	Cirrocumuli.
		28	80	80	N E	Light	Cirrocumuli. Little rain during morning, not measurable.
		72	77	W	Light	...	Scattered cirrocumuli, little rain midnight, not measurable.
		69	85	N E	Light	...	Fine.
		71	73	W	Light	...	Ditto.
		67	84	N E	Light	...	Ditto.
		72	77	W	Light	...	Ditto.
		61	69	N W	Light	...	Ditto.
		66	62	N W	Light	...	Ditto.
		67	74	E by N	Light	...	A few scattered Cirri to S. W. and hazy.
		40	40	N E	Light	...	Cirrocumuli to East horizon and hazy.
		40	40	v E	Light	...	Misty.
		40	40	N E	Light	...	Scattered cirrocumuli and misty.
		40	40	v E	Light	...	Hazy.
		40	40	N E	Light	...	Scattered cirrocumuli and cirrostrati.
		40	40	v E	Light	...	Misty.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Misty.
		40	40	N E	Light	...	Cloudy with scattered cirrocumuli.
		40	40	v E	Light	...	Misty.
		40	40	N E	Light	...	Misty around horizon.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Cloudy.
		40	40	v E	Light	...	Passing Clouds.
		40	40	N E	Light	...	High clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Passing clouds.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
		40	40	v E	Light	...	Ditto.
		40	40	N E	Light	...	Light clouds.
		40	40	v E	Light	...	Fine.
		40	40	N E	Light	...	Ditto.
		40	40	v E	Light	...	Light clouds.
		40	40	N E	Light	...	Fine.
	</						

\* Velocity in miles per hour.

STATIONS.	Decembe-	Hour.	Barometer reduced to 32° Inches.	THERMOMETER.		Humidity Sat. = 100.	WIND.		Rain.	WEATHER.
				Dry.	Wet.		Direction.	Velocity.		
DACC.	15th	9-30	29°001	69	69		S E	Light	...	Partially cloudy.
		16	29°009	70	69				...	
	16th	9-30	30°061	69	69				...	
		16	29°919	70	69				...	
	17th	9-30	30°048	70	69				...	
		16	29°981	69	69				...	
	18th	9-30	30°061	69	69				...	
		16	29°966	7	69				...	
	19th	9-30	30°051						...	
		16	29°941						...	
ROOKHN.	20th	9-30	30°021						...	
		16	29°906						...	
	21st	9-30	29°981						...	
		16	29°899	7	69				...	
	15th	9-30	29°195	66	55		W		...	
		16	29°160	71	56	33	N E		...	
	16th	9-30	29°165	66	56	53	W		...	
		16	29°132	70	58	44	Calm		...	
	17th	9-30	29°305	65	57	58	Calm		...	
		16	29°266	71	60	49	Calm		...	
DARJING.	18th	9-30	29°343	65	58	63	Calm		...	
		16	29°223	70	58	44	W		...	
	19th	9-30	29°276	64	57	62	Calm		...	
		16	29°175	71	58	40	Calm		...	
	20th	9-30	29°237	61	57	78	N E		...	
		16	29°113	70	58	44	W		...	
	21st	9-30	29°171	63	56	61	Calm		...	
		16	29°091	71	50	11	Calm		...	
	15th	9-30	23°371	39	39	100	Calm	Light	...	Dense mist. Most agreeable morning.
		16	23°296	43	40	75	S E	Light	...	Cirrocumuli. Slight round horizon.
BENIBAS.	16th	9-30	23°421	46	42	69	W	Light	...	Clear sky. Frosty morning.
		16	23°348	50	45	61	W N W	Light	...	Cumuli round horizon.
	17th	9-30	23°440	49	49	50	E S E	Light	...	Clear sky. Frosty morning.
		16	23°398	65	43	27	W by S	Light	...	Clear sky.
	18th	9-30	23°437	48	40	42	E S E	Light	...	Clear sky. Frosty morning.
		16	23°411	48	42	56	W by S	Light	...	Clear sky.
	19th	9-30	23°400	46	41	61	S E	Light	...	Covered with cirri. Frosty morning.
		16	23°325	49	43	57	W	Light	...	Clear sky.
	20th	9-30	23°372	47	41	55	S E	Light	...	Ditto. Frosty morning.
		16	23°287	52	43	41	W	Light	...	Ditto.
FALE POINT.	21st	9-30	23°344	46	43	57	N	Light	...	Ditto. Frosty morning.
		16	23°270	61	44	62	W	Light	...	Cumuli round horizon, rest clear.
	15th	10	29°035	66	58	58	N W		...	
		16	29°843	72	61	49	N W	Light.	...	Strati.
	16th	10	29°992	63	60	83	N W		...	
		16	29°887	74	63	51	N E	Light.	...	Ditto.
	17th	10	29°993	65	62	83	E		...	Cirrocumuli.
		16	29°876	74	62	47	...		...	Cumuli.
	18th	10	29°785	68	61	64	...		...	Ditto. Strati.
		16	29°884	73	62	50	N E		...	Strati.
	19th	10	29°986	64	61	83	N		...	Cumuli.
		16	29°884	73	62	50	N E		...	Strati.
BENGAL SECRETARIAT,	20th	10	29°946	68	60	60	W		...	Strati.
		16	29°824	72	62	53	N W		...	Cumuli.
	21st	10	29°889	64	60	78	Calm		...	Strati.
		16	29°790	72	61	49	N E		...	Strati.
	8th	9-30	30°058	74	66	63	N N E		...	
		16	29°965	75	67	63	E		...	
	9th	9-30	30°068	70	64	70	N N E		...	
		16	29°978	74	68	52	N E		...	
	10th	9-30	30°100	73	69	54	N E		...	
		16	30°001	73	67	51	N W		...	
The 21st December 1867.	11th	9-30	30°098	70	61	57	1		...	
		16	30°006	71	63	61			...	
	12th	9-30	30°074	68	61	64			...	
		16	29°986	71	63	61			...	
	13th	9-30	30°114	68	61	61			...	
		16	30°009	70	61	61			...	
	14th	9-30	30°091	69	61	61			...	
		16	29°986	71	61	61			...	

**Abstract of corrected Observations as received in the Meteorological  
Reporter's Office.**

NOVEMBER 1867.

HOURS OF OBSERVATION 10 AND 16.

B.—The Baronometric data are reduced for temperature, not for height above Sea level.

	1st	4th	7th	10th	13th	16th	19th	22nd	25th	28th	1st	4th	7th	10th	13th	16th	19th	22nd	25th	28th	1st	4th	7th	10th	13th	16th	19th	MEANS FOR THE MONTH.		Rain. Inches					
Ittagong	79°	4th	70°	30th	30°06	27th	26°67	1st	81°	23rd	72°	1st	30°106	23rd	29°690	1st	30°033	78°	70°	66	19														
Kyab	83°	6th	71°	17th	30°12	27th	29°814	1st	86°	7th	73°	12th	29°987	23rd	20°654	1st	29°907	75°	73°	68	15.44														
Wutack	80°	5th	70°	27th	30°25	27th	29°750	1st	82°	6th	75°	30th	30°164	28th	29°590	1st	29°987	78°	75°	87	12.59														
Madras	84°	8th	74°	28th	30°148	27th	29°890	1st	86°	11th	74°	30th	30°046	19th	29°771	1st	29°907	81°	71°	60	7.24														
Dacca	79°	9th	70°	30th	30°108	24th	29°530	2nd	79°	4th	71°	14th	30°018	27th	29°671	1st	29°926	74°	71°	84	5.60														
Darjeeling	59°	14th	48°	22nd	23°49	24th	23°270	16th	62°	30th	48°	22nd	23°441	30th	23°147	2nd	23°378	54°	50°	72	1.02														
False Point	80°	5th	71°	30th	30°15	24th	29°569	1st	81°	4th	74°	29th	30°075	30th	29°296	1st	29°981	77°	72°	76	5.80														
Benares	80°	14th	68°	27th	30°0	27th	29°751	1st	85°	5th	72°	28th	29°930	30th	29°035	1st	29°847	78°	66°	59	0.00														
Roorkee	85°	4th	50°	30th	29°37	27th	29°010	2nd	88°	1st	69°	30th	29°268	27th	28°926	2nd	29°157	76°	61°	37	0.00														

BENGAL SECRETARIAT,

HENRY F. BLANFORD,

The 6th January 1868.

Meteorological Reporter to Govt. of Bengal.



[ 11 ]  
SUPPLEMENT TO  
**The Calcutta Gazette.**

WEDNES-

DAY, JANUARY 15, 1868.

OF

OFFICIAL PAPERS.

*Non-Subscribers to the GAZETTE may receive the SUPPLEMENT separately on a payment of six Rupees per annum in Calcutta, or twelve Rupees if sent by Post.*

Report on the Closin

of the Famine Relief Operations in Orissa.

From A. B. SHEKLETON, Esq., Secretary, Orissa Famine and Orphan Relief Fund, to H. L. HARRISON, Esq., Junior Secretary to the Government of Bengal,—(No. 163, dated Calcutta, the 3rd January 1868.)

THE EXECUTIVE RELIEF FUND direct me to give Committee of the Orissa Famine and Orphan Relief Fund forward the accompanying printed letter, No. 1450, from the Special Famine Commissioner, for the information of His Honor the Lieutenant-Governor.

From E. W. MOLONY, Esq., Esq., Secretary to the Special Famine Commissioner, Cuttack, to A. B. SHEKLETON, (No. 1450.) Orissa Famine and Orphan Relief Committee, Calcutta,—

My dear Sir,— Since which time I report to the Committee was dated the 26th of October, the progress which the honor of informing the Chairman and yourself, of December. I have been made in closing relief operations to the end of as follows:—regarding Cuttack on the 3rd instant, and have now to report

Balasore.—A list of the Districts in the Province:—  
Rampuri reporting centres and hospitals have been finally closed. Mr. sick paupers—on the 15th instant that he had transferred the remaining further expense in number—to the Pilgrim Hospital. There will be no weaving relief had in gratuitous relief in this District. The cotton and account, and discontinued, and it only remains to wind up the employment given the manufactured and unmanufactured stock. The local and civil paupers on the roads is still kept up, as the having expended are not in a position to take them on just now, the season. I had a proportion of their funds during the early part of to continue the Relief Manager not to turn them adrift, but had for their wosible, at the ordinary rates, so that full value may be seen. There is not a very large stock of rice on hand, and it auth. to be disposed of. The Relief Manager has been enab. in to rates so as to clear it as quickly as possible; and fivedors, Sub-Assistant Surgeons, and Native Doctors, has f Be Relief Manager has been placed in charge of the Sub- and, where he will be able to conduct the final closing of stocks. The harvest is a plentiful one, and distress

I rapidly. B.

*Cuttack.*—The closing of centres has gone on rapidly. There were only two left, and one of the other is in Cuttack town, and will not be required more than is absolutely necessary. The result is not satisfactory in this respect, that it is found difficult to find houses or provide for any considerable number of people at any time is the case of hospitals. The only hospital which will be more than two or three Chowliagunge one in Cuttack itself, and I recollect it was at one time months of the coming year. The Committee thought that a large number of infirmies are finding employment requiring support. The people who quite allowed to shelter in the old centre buildings until they can make up their arrangements. The cotton weaving and light labor relief are, it may be, counts are all in process of relief is continued to but very few indeed, tolerably brisk demand being closed, and I am glad to say there is the stock will be disposed for thread and cloth of late. It is probable is still large, but every of before the end of the cold season. The in conformity with the effort is being made to dispose of it at Mr. Joness, Baboo's Anund wishes of the Committee. Deputy Collector transferred from relief Chunder Sein, and Juggut Chunder Gangoatterjee and Hurro Khally to other Government duty. Baboo's Hurry for relief work beyond Mookerjee are under orders, and will not be, and will have to be 31st instant. Mr. D'Silva is engaged on them is under orders to be retained until they are finally closed. Dr. F. Tained, one of whom will proceed to Calcutta, and only two Native Doctors are being reduced gradually as it becomes possible. The relief establishment are bright, and things are daily improving.

*Pooree.*—Everything in the shape of gratuity infirm paupers in the closed in this District, except the payments which institutions require charitable dispensaries of Pooree and Khoorvn upon them. There some assistance on account of the extra number cloth, and the above will be nothing but disposal of stocks of rice, tgs on hand very much expenses to meet after the 31st instant. The riven the rate of 14 annas it has been difficult to dispose of all along, and will not tempt the people per maund for clean, and ten for mixed Burmah Medical Staff are under to purchase. The Sub-Assistant Surgeon and also Mr. Ellis and Baboo orders, or have been dispensed with. Deputy Collector. Baboo Sitakunt Bijoy Mahdeb Mookerjee have been transferred to government work, and Mookerjee is under orders for employment on other Manager is engaged will not be retained beyond the 31st instant. The The crop is a very in the business of making a final closing of every from the effects of the good one generally, and the country rapidly recov-

The Committee will be glad to hear that regarding the restoration amongst the members of the native community to have lost it by

\* As it is declared in "Manu" not to be sin in times of famine. to caste of those supplant an opinion has been eating at relief centre doubt that this will

given which imposes a moderate penance. There is of the famine upon exercise a most beneficial effect in eradicating the upon the country in those who have been thrown on the public charity, option of the dis general, as it will so materially assist in the lives to assist those tressed into the general community, and will enable give a helping hand, to whom they would otherwise not have been willing and to receive them into their houses.

The Orphanage returns called for in your letter them to enter the under preparation, and I hope to be able shortly to send the new Committee to make the investment proposed, and bring act on the ment from the 1st of January. To facilitate this information, made ple of it from that date. I also hope to submit such tement of a the 31st December, as will enable them to give a clear report. To the public and Government, preparatory to issuing a

I propose after communication with the Relief Manager of Cuttack, as I find that complete statistics will not be available so soon as the Committee wish, and as I am convinced that any slight delay will be compensated for by the additional utility of the report, which should, if possible, be made to contain all information regarding famine relief that has been acquired by the experience of the working of the Committee's extensive operations, and which may be made available should necessity arise in future for the relief of general distress in this or other parts of the Empire.

### The License Tax.

*Statement of amount collected under Act XXI. of 1867 in the Lower Provinces.*

	Before reported.	PRESIDENCY.		MOFUSSIL.		Total.	
		FOR THE WEEK ENDING		Reported to close of October 1867.	In November 1867.		
		21st December.	28th December.				
		Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	
Collections	... 4,40,541 5 5	3,169 12 0	1,607 0 0	8,21,452	57,181	13,23,951 1 6	
Deduct Refunds	... 15,732 5 7	4,820 0 0	1,510 0 0	14,720	11,590	48,372 5 7	
Remaining Deductions (at the Presidency by the Examiner of Claims)	... 4,24,808 15 10	.....	97 0 0	8,06,732	45,591	12,75,578 11 10	
Govern- ment of India ...	27,120 0 0	.....	.....	.....	.....	27,123 0 0	
Govern- ment of Bengal	23,920 0 0	.....	.....	.....	.....	23,920 0 0	
Ditto at Mofussil Treasuries	....	....	....	69,692	280	69,972 0 0	
Ditto at other Local Offices	....	....	....	12,040	60	12,100 0 0	
Ditto in Military Department less refunds, Rupees 2,023 5 4	....	....	....	....	....	19,251 10 8	
• Grand Total ..	4,75,848 15 10	.....	97 0 0	8,88,464	45,931	14,27,942 6 6	

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**Withdrawal of the prohibition to  
export Rice from Orissa.**

From H. L. HARRISON, Esq., Junior Secretary to the Government of Bengal, to the Secretary to the Government of India,—(No. 4596, dated the 24th December 1867.)

In continuation of the endorsement from this

From Board of Revenue, Lower Provinces, No. 18131, dated 9th November 1867.

From Board of Revenue, Lower Provinces, No. 19171, dated 28th November 1867.

From Board of Revenue, Lower Provinces, No. 19631, dated 9th December 1867.

papers cited in the margin, on the subject of the expenditure and balance of Government rice in Orissa during the month of October last, and of the advisability of disposing of the existing stocks.

2. The Lieutenant-Governor, while admitting that there is much force in the reasons brought forward by the Board for simultaneously removing the prohibition on exportation, and also taking active steps to dispose of the stocks in hand on as favorable terms as possible, is still of opinion that it would be more prudent to abstain from taking both these steps at the same time. It seems clear that existing stocks, until replenished by the present crop, must still be very low throughout the Cuttack and Pooree districts. On the other hand ready money is much wanted in the Province, and if the exporter were to go into the market with money in his hand while the producers are dazzled by the abundant yield of the new crop, and the petty purchaser has his golahs over-full, it is not unlikely that he might carry off more than is desirable, to an extent that the people would themselves have cause to regret a few months later.

3. Under these circumstances two alternatives suggest themselves to the Lieutenant-Governor, either (1) to sell off the Government stocks, as proposed by the Board, and to continue the prohibition against the exportation of rice until next April, thus leading the Province to replenish its stocks by keeping all of this year's crop which it cannot export by land, or (2) to withdraw the prohibition at once as recommended by the Board, and as a measure of precaution against an excessive drain, to retain in the Province a large proportion of the present stock in the hands of Government, in spite of the possibility or even probability of thereby incurring some further loss.

4. If the latter alternative be adopted the Lieutenant-Governor would on no account clear off the Government stocks before March next, by which time it will be seen how far the people have availed themselves of the permission to sell for export. His Honor would merely order the immediate sale of the rice which is suffering from damp and weevils, and the clearance of the Golahs at which comparatively small quantities are stored, so as to concentrate what is kept, and reduce the cost of establishment as far as possible. It should be remembered that in addition to the 6,31,832 maunds of rice now in store, the Relief Committee will probably restore to Government a considerable quantity which will be left upon their hands. It is not therefore intended that all this rice should be kept if the prohibition against exporting is withdrawn, but

that a reasonably large stock may be allowed to remain, sufficient to keep in check the monopolist dealers, and to keep down their prices should this be found necessary next year.

5. After carefully considering these two alternatives, the Lieutenant-Governor is disposed to give the preference to that of retaining a large portion of the Government stocks, and removing the prohibition against exportation as speedily as possible, as involving the least degree of interference with the people and with the operations of trade. But as this is a very important question, and one which determines the general policy to be pursued in Orissa during the ensuing year, His Honor desires, before taking action on the views expressed above, to be informed whether they meet with the approval of His Excellency the Governor General in Council. An early reply is solicited, to enable the prohibition to be removed as soon as possible, if that course be decided on.

From J. GEOGHEGAN, Esq., Under-Secretary to the Government of India, to H. L. HARRISON, Esq., Junior Secretary to the Government of Bengal,—(No. 60, dated the 7th January 1868.)

I AM directed to acknowledge the receipt of your letter No. 4596, dated the 24th ultimo, with enclosures, on the subject of the expenditure, and balance of Government rice in Orissa, during the month of October last, and of the course to be pursued in that Province during the ensuing year.

2. In reply I am directed to state that the Governor General in Council concurs with the Lieutenant-Governor, and sanctions the adoption of the 2nd of His Honor's alternative proposals, i. e., the withdrawal of the prohibition to export rice and the retention in the Province of a large proportion of the present stock in the hands of Government.

From H. L. HARRISON, Esq., Junior Secretary to the Government of Bengal, to the Secretary to the Board of Revenue, Lower Provinces,—(No. 157, dated the 13th January 1868.)

WITH reference to your letter No. 19631, dated the 9th ultimo, and previous communications, I am directed to forward herewith a copy of the correspondence cited in the margin, and to request that the Board will give their early attention to paragraph 4 of the letter of this Government, the suggestions contained in which should be carefully attended to.

2. The correspondence will be published in the next *Gazette*, and I am to request that the Board will at once submit, for the information of Government, copy of any instructions which they may issue to the Commissioner Division on the subject. A Telegram has this day been sent to the Commissioner requesting him at once to make the withdrawal of the prohibition to export rice widely known in the Province.

Results of the Meteorological Observations taken at the Surveyor-General's  
Office, Calcutta, from 1st to 7th January 1868.

MONTH.	Date.	Reduced Reading of Baro- meter at 10 A. M. Inches.	THERMOMETER.			Daily Range of the Mean Temperature.	Mean Temperature for the day.	Mean Wet Bulb.	Computed Mean Dew-point.	Mean Degree of humidity for the day.	Prevailing Direction of Wind during the day.	Rain. Inches	Max. Pressure of Wind. lb.	GENERAL REMARKS.
			Highest Reading. ○	Lowest Reading. ○	Dew-point. ○									
Jan.	1st	30'161	73'5	65'0	15'5	65'5	69'9	55'4	0'71	N & N N W	...	...	Clear. Slightly foggy at midnight.	
	2nd	185	71'8	62'2	13'6	64'2	58'0	52'4	'97	N	...	...	Clear.	
	3rd	176	72'2	55'4	16'8	63'0	57'2	52'0	'69	N & N N W	...	...	Ditto.	
	4th	124	74'5	57'4	17'1	65'4	59'0	53'9	'68	N W	...	...	Ditto.	
	5th	094	77'5	59'0	18'5	67'8	64'2	61'3	'81	N W & S W	...	...	Clear, and scattered cirro- cumilia.	
	6th	064	79'5	64'0	14'0	70'3	67'1	61'5	'83	W & S S W	...	...	Clear. Foggy from 2 to 9 A. M.	
	7th	072	78'5	66'5	12'0	71'8	67'5	64'1	'78	N W	...	...	Clear, and stratus. Foggy at midnight, and from 7 to 10 P. M.	

The mean Temperature and the mean Wet Bulb are derived from the twenty-four hourly Observations made during the day.

The Dew-point is computed with the Greenwich constants. The figures in column ten represent the humidity of the air, the complete saturation of which being taken at unity. The receiver of the lower rain gauge is 1 foot 2 inches, and that of the Anemometer 70 feet 10 inches, above the level of the ground.

The extreme variation of Temperature during the past seven days ... ... 24'1

The Max. Temperature during the past seven days ... ... 79'5

The Max. Temperature during the corresponding period of the past year ... ... 80'2

The mean humidity during the past seven days ... ... 0'74

The mean humidity during the corresponding period of the past year ... ... 0'72

Inches.

The total fall of rain from 1st to 7th { by lower rain gauge ... ... Nil.

{ by Anemometer gauge ... ... Nil.

Ditto ditto from 1st to 7th average of fourteen previous years ... ... Nil.

Ditto ditto between the 1st January and the 7th current ... ... Nil.

Ditto ditto during the corresponding period of the past year ... ... Nil.

GOPEENAUTH SEN,

*In charge of the Observatory.*

The 11th January 1868.

## Meteorological Report up to 31st December 1867.

STATION.	December.	Hour.	Barometer reduced to 32°.	THERMOMETER.		Humidity Sat. = 100.	WIND.		Rain.	WEATHER.
				Dry.	Wet.		Direction.	Velocity.		
CALCUTTA.			Inches.	Θ	Θ					Inches.
	22nd	10	30°134	70	62	61	N N E	...	...	Clear.
		16	29°993	74	62	47	N	...	...	Ditto.
	23rd	10	30°177	70	63	65	N	...	...	Ditto.
		16	30°048	74	63	51	N by W	...	...	Ditto.
	24th	10	30°180	69	62	65	N	...	...	Ditto.
		16	30°048	74	63	51	N	...	...	Ditto.
	25th	10	30°151	69	63	70	N by E	...	...	Scattered cirri, and Cirrostrati.
		16	30°032	73	63	57	N	...	...	Cirro cumuli.
	26th	10	30°139	70	62	61	N	...	...	Scattered Cirrocumuli to S.
		16	30°005	76	65	52	N	...	...	Cirrocumuli to S. and W.
	27th	10	30°121	74	66	63	N	...	...	Clear.
		16	30°013	77	67	58	N	...	...	Ditto.
	28th	10	30°153	72	64	62	N N E	...	...	Ditto.
		16	30°027	76	65	52	N E	...	...	Ditto.
SAVAGE ISLAND.	29th	10	30°157	71	63	61	N E	...	...	Ditto.
		16	30°025	75	65	55	N	...	...	Scattered cirrostrati.
	30th	10	30°180	67	60	64	N	...	...	Clear.
		16	30°030	73	64	58	N	...	...	Ditto.
	31st	10	30°144	67	61	69	N	...	...	Ditto.
		16	30°017	73	64	58	N	...	...	Covered with cumuli.
CHITTAGONG.	22nd	9-30	30°041	68	62	69	N E	Light	...	Clear.
		16	29°984	75	65	55	N E	Light	...	Ditto.
	23rd	9-30	30°191	68	62	69	N by E	Light	...	Ditto.
		16	30°033	75	65	55	N	Light	...	Ditto.
	24th	9-30	30°111	67	61	69	N by E	Moderate	...	Ditto.
		16	30°042	75	66	59	N	Light	...	Ditto.
	25th	9-30	30°063	63	63	74	E by N	Light	...	Partial cloud.
		10	3°025	74	67	67	N W by N	Light	...	Clear.
	26th	9-30	30°071	67	62	74	N by W	Light	...	Ditto.
		16	29°990	76	66	56	N	Light	...	Scattered clouds.
	27th	9-30	30°063	72	68	80	N by W	Light	...	Clear.
		16	29°995	73	73	77	N W by W	Light	...	Ditto.
	28th	9-30	30°076	70	66	79	E by N	Light	...	Ditto.
		16	30°010	76	69	68	N	Light	...	Ditto.
	29th	9-30	30°001	68	62	60	N E	Light	...	Ditto.
		16	30°010	76	70	72	N by W	Light	...	Ditto.
AKRAB.	30th	9-30	30°105	66	61	73	N by E	Light	...	Ditto.
		16	30°014	74	65	69	N W	Light	...	Ditto.
	31st	9-30	30°074	67	61	69	N by E	Light	...	Ditto.
		16	30°003	73	71	90	N	Light	...	Ditto.
22nd	9-30	29°957	67	65	89	N	Light	...	Clear.	
		16	29°874	71	67	80	W S W	Light	...	Ditto.
	23rd	9-30	30°009	66	63	83	N	Light	...	Ditto.
		16	29°926	71	67	80	W	Light	...	Ditto.
	24th	9-30	30°012	66	63	83	N E	Light	...	Ditto.
		16	29°926	71	67	80	S W	Light	...	Ditto.
	25th	9-30	29°915	65	62	83	N E by N	Light	...	Cirrocumuli
		16	29°909	69	66	84	S W	Light	...	Ditto ditto.
	26th	9-30	29°982	65	61	78	N	Light	...	Clear.
		16	29°892	68	65	84	W S W	Light	...	Ditto.
	27th	9-30	29°967	67	63	79	N	Light	...	Ditto.
		16	29°894	71	67	80	W	Light	...	Ditto.
	28th	9-30	29°989	66	63	83	N E	Light	...	Clear. Moderate wind from N. and N. E. last night and this morning.
		16	29°919	70	65	75	S W	Light	...	Clear.
29th	9-30	29°097	64	60	78	N	Light	...	Hazy.	
		16	29°898	70	65	75	S W	Light	...	Clear.
	30th	9-30	30°003	65	62	83	N	Light	...	Hazy.
		16	29°899	69	66	84	W by S	Light	...	Ditto.
	31st	9-30	29°977	63	60	83	N	Light	...	Ditto.
		16	29°904	68	64	79	S W	Light	...	Clear.
22nd	9-30	30°033	73	68	80	N E	Light	...	Fair and fine.	
		16	29°927	78	69	61	W	Light	...	Ditto ditto.
	23rd	9-30	30°071	69	66	84	N E	Light	...	Ditto ditto.
		16	29°933	76	70	72	W	Light	...	Ditto ditto.
	24th	9-30	30°081	68	65	84	N E	Light	...	Ditto ditto.
		16	29°985	75	69	72	W	Light	...	Ditto ditto.
	25th	9-30	30°073	67	64	84	N E	Light	...	Ditto ditto.
		16	29°955	75	68	68	W	Light	...	Ditto ditto.
	26th	9-30	30°046	67	65	89	N E	Light	...	Ditto ditto.
		16	29°955	75	68	68	W	Light	...	Ditto ditto.
	27th	9-30	30°023	70	66	79	N by E	Light	...	Ditto ditto.
		16	29°930	77	70	68	W	Light	...	Ditto ditto.
	28th	9-30	30°044	69	65	79	N	Light	...	Ditto ditto.
		16	29°917	78	66	49	N W by N	Light	...	Ditto ditto.
	29th	9-30	30°062	66	61	73	N	Light	...	Ditto ditto.
		16	29°945	75	66	59	W	Light	...	Ditto ditto.
30th	9-30	30°014	68	66	89	N E	Light	...	Ditto ditto.	
		16	29°910	77	71	73	W	Light	...	Ditto ditto.
	31st	9-30	30°061	69	65	79	N E	Light	...	Ditto ditto.
		9-30	29°910	77	71	73			...	

Date	Compt.	Hour.	Barometer re- duced to 32°	THERMOMETER		Humidity Sat. = 100.	WIND.		Rain.	REMARKS.
				Dry.	Wet.		Direction.	Velocity.		
			Inches.	°	°					Inches.
22nd	9-30	30-160	67	60	64	N by W	Light	...	...	Fine.
	16	30-066	72	61	49	N	Light	...	...	Clear.
23rd	9-30	30-161	65	61	78	W by S	Light	...	...	Misty.
	16	30-160	74	64	55	N N E	Light	...	...	Misty around horizon.
24th	9-30	30-219	67	63	74	W by N	Light	...	...	Hazy.
	16	30-080	75	62	44	E by N	Light	...	...	Cirro strati.
25th	9-30	30-165	68	63	74	N	Light	...	...	Scattered cirro strati and hazy.
	16	30-068	75	64	51	E by N	Light	...	...	Scattered cirri.
26th	9-30	30-173	69	63	70	S S E	Light	...	...	Cirri and misty.
	16	30-045	77	64	45	E by N	Light	...	...	Cirri and misty appearance around horizon.
27th	9-30	30-151	69	64	74	N W by W	Light	...	...	Hazy.
	16	30-085	76	66	56	N W	Light	...	...	Scattered clouds and misty horizon to E.
28th	9-30	30-181	70	67	84	E by N	Light	...	...	Scattered cirri and misty to N. E.
	16	30-038	76	65	52	E	Light	...	...	Cirro strati and cirro cumuli.
29th	9-30	30-145	74	68	72	E	Light	...	...	Overcast with cirro cumuli and cirro strati.
	16	30-038	77	66	53	E by N	Light	...	...	Scattered cirri and misty horizon.
30th	9-30	30-162	74	67	67	N E by E	Moderate	...	...	Unsteady wind overcast with cirro strati.
	16	30-068	76	66	56	E	Light	...	...	Scattered cirri.
31st	9-30	30-145	72	65	66	E	Light	...	...	Overcast with cirro strati.
	16	30-055	75	67	63	W N W	Light	...	...	Scattered cirro strati.
22nd	10	29-082	78	69	61	N	10*	...	...	Fine.
	16	29-051	79	69	58	N N E	12*	...	...	Ditto.
23rd	10	29-005	77	69	64	N	12*	...	...	Ditto.
	16	29-080	79	71	65	N N E	15*	...	...	Ditto.
24th	10	29-058	78	71	69	N N W	5*	...	...	Passing clouds.
	16	29-047	80	73	66	E	8*	...	...	Fine,
25th	10	29-014	76	73	81	N by E	7*	...	...	Cloudy.
	16	29-027	77	73	77	N N E	11*	0'14	...	Ditto.
26th	10	29-064	75	71	81	N E by N	13*	0'04	...	Ditto.
	16	29-055	77	73	81	N E by N	12*	...	...	Ditto.
27th	10	30-094	78	72	73	N E by E	10*	...	...	Ditto.
	16	29-088	79	71	65	E N E	12*	...	...	Passing clouds.
28th	10	30-089	79	70	61	N E by E	12*	...	...	Light clouds.
	16	29-076	78	70	65	N E	11*	...	...	Passing clouds.
29th	10	30-096	78	70	65	N E	13*	...	...	Light clouds.
	16	29-048	78	70	65	N E	12*	...	...	Ditto.
30th	10	30-103	78	69	61	N E	11*	...	...	Ditto.
	16	30-003	79	69	58	N E	12*	...	...	Passing clouds.
31st	10	30-106	76	70	72	N N E	6*	...	...	Fine.
	16	29-955	78	69	61	N E	13*	...	...	
										{ Calm.
22nd	9-30	29-225	63	54	56	S W	...	...	...	
	16	29-130	71	59	44	S SW	...	...	...	
23rd	9-30	29-212	63	57	67	Calm	...	...	...	Calm.
	16	29-135	69	57	43	W	...	...	...	
24th	9-30	29-267	62	53	66	S E	...	...	...	
	16	29-185	60	57	43	Calm	...	...	...	Cloudy, sharp E. wind all day, continuous rain all night.
25th	9-30	29-169	66	55	45	S E	...	...	...	
	16	29-016	69	58	47	S E	...	...	0'55	Cloudy morning, light rain.
26th	9-30	29-245	55	55	100	S E	...	...	...	
	16	29-180	60	57	82	N W	...	...	...	{ Clear.
27th	9-30	29-215	62	56	66	Calm	...	...	0'11	
	16	29-138	67	58	55	N W	...	...	...	Cloudy, dense fog from S. W.
28th	9-30	29-230	51	51	100	Calm	...	...	...	
	16	29-163	57	56	93	N W	...	...	...	Very foggy.
29th	9-30	29-273	49	49	100	Calm	...	...	...	
	16	29-181	57	64	81	S W	...	...	...	Very foggy and cloudy; few drops of rain at 4½ p. m.
30th	9-30	29-265	52	51	93	Calm	...	...	...	
	16	29-173	55	54	93	Calm	...	...	...	Very foggy and cloudy till 1 p. m., but clearing after that.
31st	9-30	29-243	53	61	86	Calm	...	...	...	
	16	29-156	61	58	71	S W	...	...	...	
										{ Strati.
22nd	10	29-923	68	61	64	W	...	...	...	Ditto.
	16	29-853	73	61	50	Calm	...	...	...	
23rd	10	29-950	66	60	68	S W	...	...	...	
	16	29-858	71	61	53	W	...	...	...	
24th	10	29-972	68	59	63	E	...	...	...	
	16	29-777	72	61	49	N E	Moderate	...	...	
25th	10	29-909	69	64	74	Calm	Moderate	...	...	Cirro cumuli.
	16	29-811	74	66	63	N W	...	...	...	Ditto ditto cirro strati.
26th	10	29-938	60	59	94	W	Strong	...	...	Cumuli.
	16	29-942	73	62	44	W	Light	...	...	Strati cumuli.
27th	10	29-951	66	55	93	S W	Light	...	...	Cumuli strati, very foggy till 10 A. M.
	16	29-851	68	61	64	N E	Light	...	...	Cumuli strati.
28th	10	29-941	63	61	88	S W	...	...	...	Cirro cumuli strati.
	16	29-841	69	60	56	N W	Light	...	...	Ditto foggy till noon.
29th	10	29-988	52	52	100	W	Light	...	...	{ Very foggy till noon.
	16	29-856	60	63	82	N W	Light	...	...	
30th	10	29-954	52	52	100	W	Light	...	...	Cirri, very foggy till 2 p. m.
	16	29-856	60	63	82	N W	Light	...	...	

\* Velocity in miles per hour.

STATION.	Date.	Hour.	Barometer re-diced to 32°.	THERMOMETER.			Humidity Sat. = 100.	WIND.		Rain.	WEATHER.
				Dry.	Wet.	Direction.		Velocity.			
Dacca.	22nd	9-30	30°011	69	64	24	N W	...	...	Light wind,	clear.
		16	29°919	70	64	79	N N W	...	...	Ditto	ditto.
	23rd	9-30	30°056	67	63	79	N N W	...	...	Ditto	ditto.
		16	29°989	70	65	75	N N W	...	...	Ditto	ditto.
	24th	9-30	30°051	69	63	70	N W	...	...	Ditto	ditto.
		16	29°956	71	63	61	N W	...	...	Ditto	ditto.
	25th	9-30	30°041	69	63	70	N	...	...	Ditto	partially cloudy.
		16	29°951	69	64	74	N W	...	...	Ditto	cloudy.
	26th	9-30	30°024	68	63	74	N N W	...	...	Ditto	clear.
		16	29°919	70	64	70	N W	...	...	Ditto	ditto.
	27th	9-30	30°021	69	64	74	N	...	...	Ditto	ditto.
		16	30°033	70	66	79	N W	...	...	Ditto	ditto.
	28th	9-30	30°051	70	66	70	N	...	...	Ditto	ditto.
		16	29°943	69	63	75	N	...	...	Ditto	ditto.
	29th	9-30	30°041	72	67	60	N W	...	...	Light wind, clear.	
Dargaiing.		16	29°932	69	64	74	N W	...	...	Ditto	
	30th	9-30	30°059	66	62	78	N N W	...	...	Ditto	
		16	29°932	69	63	70	N N W	...	...	Ditto	
	31st	9-30	30°017	67	62	74	N W	...	...	Ditto	
		16	29°944	68	62	69	N W	...	...	Ditto	
	22nd	9-30	23°352	45	42	76	S E	Light	...	Clear sky. Frosty morning.	
		16	23°277	49	44	63	W by S	Light	...	Stratus cumuli round horizon.	
	23rd	9-30	23°362	45	42	76	S	Light	...	A few thin clouds. Frosty morning.	
		16	23°309	47	43	69	N W by W	Light	...	Cumuli round horizon, rest clear.	
	24th	9-30	23°402	47	44	77	S E	Light	...	A few thin clouds. Frosty morning.	
		16	23°316	50	45	64	W	Light	...	Stratus cumuli round horizon.	
	25th	9-30	23°370	47	41	55	E by S	Light	...	Clear sky. Frosty morning.	
		16	23°310	47	43	69	W by S	Light	...	Ditto	
	26th	9-30	23°369	48	43	63	S W by S	Light	...	A few thin clouds. Frosty morning.	
		16	29°260	47	44	77	W by S	Light	...	Misty.	
	27th	9-30	29°323	45	43	84	S E	Light	...	Cumuli round horizon, low sand from S. E.	
		16	23°245	49	43	57	W	Moderate	...	Ditto and few thin clouds.	
	28th	9-30	23°312	41	41	100	S W	Light	...	Misty.	
		16	23°263	44	42	83	W	Light	...	Ditto.	
	29th	9-30	23°361	46	42	69	S E by E	Light	...	Cumuli round horizon.	
False Point.		16	23°286	46	43	51	W by S	Light	...	Ditto.	
	30th	9-30	23°370	50	43	77	S E by E	Light	...	Clear sky. Frosty morning.	
		16	23°296	47	44	77	W by S	Light	...	Ditto.	
	31st	9-30	23°334	47	43	69	S E	Moderate	...	Ditto. Frosty morning.	
		16	23°264	44	43	91	W N W	Moderate	...	Misty.	
	15th	9-30	30°061	69	60	56	N W	...	...	Light weather and fine.	
		16	30°006	71	63	61	E	...	...	Ditto ditto.	
	16th	9-30	30°124	68	60	60	N N E	...	...	Light winds and hazy.	
		16	30°020	71	65	70	E	...	...	Light weather.	
	17th	9-30	30°125	67	57	50	N	...	...	Ditto.	
		16	30°020	71	66	75	E	...	...	Ditto.	
	18th	9-30	30°114	69	63	74	N N E	...	...	Light winds and fine.	
		16	30°003	72	65	66	N E	...	...	Light weather.	
	19th	9-30	30°086	67	61	69	N N E	...	...	Mod. breezes.	
		16	29°979	70	65	75	N E	...	...	Mod. weather.	
	20th	9-30	30°054	68	63	74	N E	...	...	Fresh breezes and fine.	
		16	29°946	71	65	70	N E	...	...	Ditto weather.	
	21st	9-30	30°041	69	63	70	N	...	...	Moderate breezes and fine weather.	
		16	29°936	71	64	66	E	...	...	Hazy fresh breezes and fine weather.	
	22nd	9-30	30°016	67	62	74	N	...	...	Light weather.	
		16	29°948	71	63	61	E N E	...	...	Hazy fresh breezes.	
	23rd	9-30	30°094	68	64	79	N	...	...	Light weather.	
		16	30°003	72	67	75	E	...	...	Light winds and fine.	
	24th	9-30	30°124	68	64	79	N E	...	...	Ditto ditto.	
		16	30°016	71	65	70	E N E	...	...	Ditto weather.	
	25th	9-30	30°078	70	65	75	N E	...	...	Ditto winds and fine.	
		16	29°983	72	65	66	N E	...	...	Moderate breezes.	
	26th	9-30	30°081	69	65	70	N E	...	...	Light weather.	
		16	29°971	73	66	67	N E	...	...	Ditto ditto.	
	27th	9-30	30°058	70	65	75	N W	...	...	Ditto air and fine.	
		16	29°971	73	70	85	E	...	...	Ditto winds and fine.	
	28th	9-30	30°081	69	65	79	N E	...	...	Ditto weather.	
		16	29°978	74	70	81	E S E	...	...	Ditto ditto.	

BENGAL SECRETARIAT,  
The 11th January 1863.

HENRY F. BLANFORD,  
*Meteorological Reporter to Govt. of Bengal.*



# SUPPLEMENT TO The Calcutta Gazette.

THURSDAY, JANUARY 16, 1868.

## OFFICIAL PAPERS.

*Non-Subscribers to the GAZETTE may receive the SUPPLEMENT separately on a payment of six Rupees per annum if delivered in Calcutta, or twelve Rupees if sent by Post.*

### Improvement of the Port of Calcutta.

From LIEUTENANT-COLONEL J. E. T. NICOLLS, R. E., Secretary to the Government of Bengal, in the Public Works Department, to the Chairman of the Committee of Justices for the improvement of the Port of Calcutta, — (No. 46M., dated the 8th November 1867.)

I AM directed to acknowledge the receipt of your letter No. 93 of the 31st ultimo, with copy of a Resolution passed by a Meeting of your Committee held on the 30th idem.

2. In reply I am to convey to you the Lieutenant-Governor's approval to your at once transferring the Strand Bank, with the establishment at present employed thereon, to the Commissioner of Police.

3. I am further to request that all plans and estimates already prepared in connection with the projected Port improvements may be forwarded to the Chief Engineer of Bengal.

No. 47M.

COPY of the above forwarded to the Commissioner of Police for the Town of Calcutta for information and guidance.

From LIEUTENANT-COLONEL J. E. T. NICOLLS, R. E., Secretary to the Government of Bengal, in the Public Works Department, to the Secretary to the Government of India, in the Public Works Department, — (No. 49M., dated the 18th November 1867.)

REPPRING to paragraphs 6 and 8 of your letter No. 673C. of the 16th September last, I am directed by the Lieutenant-Governor to forward a copy of a letter from the Chairman of the Committee of Justices for the improvement of the Port of Calcutta, No. 93, dated 31st ultimo, forwarding copy of a Resolution by that body, under date the 30th idem, in which the Committee state their opinion that it is not within their competency to carry out any works, except in accordance with the Act under which they are constituted, and they authorize the Chairman "to make over to

Government all plans and estimates already prepared in connection with the project, and authorize the Chairman to re-transfer the Strand Bank to the Commissioner of Police."

I am also to forward a copy of the reply to the above letters, Nos. 46 and 47M., dated 8th current, and to submit the following remarks for the information and orders of the Government of India.

The Committee having declined to take action, in accordance with the only terms under which they can obtain funds for carrying out their works, and having given up the Strand Bank, the Lieutenant-Governor purposes, under the authority accorded to him, to make arrangements for carrying out, through the direct agency of the Public Works Department, the small project which has been approved by the Government of India.

I am, however, to remark that in my letter No. 4395, dated the 8th July 1867, the Lieutenant-Governor only limited his recommendation to this smaller project, because, owing to the difficulties regarding the Committee, it would have been undesirable to enter on the larger scheme; but now that these difficulties have been removed by the inability of the Committee to carry on work, and it is possible to execute the work on a certain footing, His Honor would recommend an extension of the experimental measures to be undertaken by the Government through the Public Works Department, so as to include the construction of the jetties for sea-going ships, complete with sheds, tramway, &c., amounting, according to Mr. Leonard's rough estimate, to Rupees 4,41,000.

This recommendation is based on the length of time that must elapse between a decision on the subject and the attainment of any practical result. The jetties must be ordered from England, and it would not be prudent to calculate on less than a year as the time within which they could be procured from so great a distance; so that, if there is any present delay, it will be impossible to take advantage of the active commercial season of 1868-69, in order to test the suitability of jetties for the requirements of the Port, and to

obtain the practical experience connected with the subject, which is so valuable in an important and costly undertaking like the improvement of the Port of Calcutta.

The annexed able report\* by Mr. Leonard enters very fully into the question and shews the likelihood of jetties being the

\* Dated the 28th November 1868.  
form that the improvement of the Port will eventually take; but however this may be, it is evident that, although it is possible that these jetties may not prove the most perfect form of landing arrangement, still they are certain to prove very efficient and a great advantage to the Port, whilst the experience that they will afford in regard to loading and unloading the shipping from wharves will, as already noticed, be of the greatest value in eventual arrangements.

Under these circumstances the Lieutenant-Governor is opinion that it is most desirable that the work should be carried out with the least practicable delay, and the cost of these jetties will by no means be expenditure thrown away, as such expenditure must be most useful, and it is exceedingly unlikely that a scheme already well-considered and fully approved of by the present Port Trust Committee would meet with disapproval from any future body charged with the improvement of the Port of Calcutta.

\* \* \* \* \*

The remaining questions in your letter are receiving attention from the Lieutenant-Governor, and will form the subject of a separate communication.

The Lieutenant-Governor has not pressed the project for providing accommodation for steamers, amounting to Rupees 1,45,000; for, although very desirable, it is not of the same pressing nature as providing landing convenience for the shipping.

In conclusion I am to express the Lieutenant-Governor's hope that the important recommendation contained in the letter will receive favorable consideration from the Government of India.

\* \* \* \* \*

Since this letter was drafted the accompanying memorandum from Mr. Leonard has been received in continuation of his report to the Committee.

#### *Report on the means proposed for the Improvement of the Strand Bank.*

The instructions under which I prepare this report are the following extract from the proceedings of the Meeting of the "River Trust Committee," dated 3<sup>rd</sup> July last:—

"The Committee are of opinion that definite measures should be adopted at once for the construction of such temporary works as shall tend to diminish the inconvenience now experienced in the landing and shipment of goods, and that will bring in also some immediate income. These objects may be best obtained by selecting a portion of the Strand Bank for the construction of rough jetties or floating wharfs adapted to meet the want of boats and country vessels. Simultaneously measures might be adopted for providing a few jetties or wharfs for sea-going ships. Suitable sheds for the reception of goods would also have to be constructed."

The remainder of the resolutions passed at the meeting, refer to the collection and arrangement

of the necessary information to enable parties to prepare a complete scheme of Harbour Improvement. These I shall not notice for the present.

2. Whatever the nature of the works which are required to meet the views of the Committee shall be, I think it is quite certain that they should be such as may form part of an ultimate, complete scheme—at any rate such as will afford the strongest possible grounds for belief that they are suited to form part of it. Any work that may be carried out now will cost a large sum of money; it must be of a character that will last for a considerable length of time, otherwise there would be great risk that it would not stand long enough for even temporary purposes, until a complete scheme could be carried out. In fact any works done now should be good twenty years hence, and it would be much to be regretted if they should have to be removed to make room for others. All parties concerned must be more likely to approve the project now proposed, if they believe it to be adapted to form part of a larger scheme. I make these remarks as a kind of apology for discussing with some care the question of what kind of works will probably be ultimately adopted. Fortunately the subject has been already frequently and tolerably carefully considered; proposals have been made, and plans have been put forward by able men, by men of large Indian experience, as well as by others who have only European examples to guide them. The question has been considered by two different committees; one of them has most carefully and fully considered it, so that we have the advantage already of several projects, and some sound opinions on them.

3. Leaving the question of docks aside for the present,—although it is tolerably certain that it will form part of a general scheme,—three plans for providing accommodation for loading and unloading sea-going vessels have been proposed:

1. A Floating Wharf.
2. A Quay Wall.
3. A Series of Jetties,

The first affords the greatest amount of convenience and facility for loading and unloading in a river having such a range of tide as the Hooghly, because it remains at the same relative height to the vessel at all stages of the tide, which is a matter of great convenience, and one very highly valued by owners of vessels. At Plymouth, steamers were willing to pay, and did pay, 6d. a ton more for the privilege of unloading at the floating stage than they should pay for unloading at the wharf wall. It also has the advantage of being easily and quickly executed, being easily changed from place to place, if desired, and I believe suitable floating wharfs could be erected at a cost not very much exceeding that of good jetties, and at a less cost than any really safely founded wharf wall. An objection has been raised against it on account of the difficulty of mooring in the Hooghly current; but the difficulty cannot be greater here than in the Mersey, where the tide runs just as rapidly as it does in the Hooghly, yet there, a floating wharf on a large scale has stood for many years, and it must be a decided success too, as another has lately been erected on the Birkenhead side, on a scale eclipsing everything that has preceded it. The real danger in the Hooghly is another cyclone; a floating jetty would not have stood against the last, and if the whole Harbour had been provided with them, and

boats put out of the market by their use, the result would have been disastrous. Cyclones in this Port, however, are not of frequent occurrence; although the mere possibility of such an event may afford fair grounds for declining to make the whole loading and unloading arrangements of the Port of a kind that could be destroyed by it, it does not appear to justify the total rejection of such a very convenient and useful work on a small scale. If one or two floating wharfs were erected towards the up-stream end of the shipping bank, the worst that could occur would be their own destruction, and even such a probability is extremely remote. I look upon floating jetties as a part of the ultimate scheme for the improvement of the Port; but I forbear from recommending them now, because the East Indian Railway Company are erecting two on a very fair scale, and we may benefit from the experience to be gained by observing these works without incurring any risk ourselves; and further, it is most likely that these very jetties will yet be transferred to the River Trust, as when the bridge over the Hooghly shall be built, they will not be required by the railway.

4. The second scheme, a wharf wall, a continuous wharf wall, is a favorite scheme with many, not merely on account of its fitness to meet the wants of the trade of the Port, but also because it would be such an improvement to the town, and such an improvement to the river—the remark evidently referring as much to appearance as to utility. Now those who take this view of the question must have some particular river in view,—the Seine in Paris, the Arno at Florence, or the upper part of the Liffey in Dublin: they can hardly be thinking of the quay walls of Glasgow, Bristol, Newcastle, or Havre; nor even of the shipping part of the Liffey. If a quay wall, meant to accommodate a large shipping trade, answer what it is intended for, it must be covered with planks, and ropes, and chain; hides, and barrels, and boxes; cattle, and pigs, and sheep, and a good deal of dirt; so that in appearance the city is not improved by it at all. Nor does it improve the appearance of the river so much as many think; if it be as much used as it should be, it is almost completely hidden by two or three tiers of ships, the only parts usually visible being those where gaping sewers pour out their contents. And lastly, as to the health of the crews of the ships, I believe the partial open provided by a slope, would afford them cooler and far better air than they would have if packed close up to a river wall. The fact is, an ornamental river edge and a large shipping trade do not go together; the latter has its advantage, but beautifying the spot which it occupies is not one of them. What people generally think of when they talk of a quay wall being a great improvement, is, a neat footpath, and an ornamental railing or wall along the river side, and water up to the edge, instead of a bank covered with mud and filth. All this can be given with the greatest ease, and at a comparatively small cost, along that part of the City where people generally require something ornamental, and where they would go to see it—that is, from, say, Chandpaul Ghaut to Prinsep's Ghaut. A revetment wall can be built from a little above ordinary low water line to the land surface; the ground behind can be filled in, ghauts formed, and every thing done to make it ornamental; but particular ornament on the goods portion of the bank need

not be looked for—a wharf wall would not ensure it.

5. A stronger argument in favour of the wall is, that it would form a better line for the current, and thus would not allow offensive matter to remain along the bank; this is correct, but it is made too much of. The Hooghly is not a dirty river—I say so advisedly; it is not a tenth part as dirty as the Thames, the Clyde, or the Tyne; true, with the arrangement of dirt-traps which now exist—a large width of bank made up of hollows and heights, a depository for rubbish and dirt of all kinds, it cannot but be disagreeable; but I am certain, that if the bank were sloped and paved and received the attention that it ought to receive to keep it free from deposits of all kinds, nothing in the least degree offensive would be visible. That portion of it which will be in the hands of the River Trust will, it is to be hoped, be so kept, and although an upright wall is decidedly the best arrangement for keeping offensive matter in motion, a well aligned and properly made bank can only require attention to keep it free from filth, and, therefore, as far as cleanliness is concerned, unobjectionable. I am convinced that the health of the City will not suffer in the smallest degree by such an arrangement.

6. There is no doubt whatever too, that a wharf wall is a more convenient arrangement for shipping than a series of jetties; it affords more room for the work of loading and unloading generally. And it is clear also that a good deal of ground would be made by carrying out such a project. But if general convenience be considered, that is, the convenience of those who desire to land from boats—if any such can be found bye and bye—as well as of those who desire to land at the wharf, it would be best met by a series of convenient wharfs at certain distances, with sloping banks between. And with reference to the land that could be made by a continuous wall, there should be room enough on the jetty head for all the purposes to which it ought to be devoted, and there is really room enough to accommodate a very large trade on the ground already made, that which may be formed by raising the parts which are at present too low, and by forming the slope properly up from the water edge. Indeed, if the Trust cannot build warehouses and other such structures on the present river bank, there seems to be ample land available for all really useful purposes, and it would be waste of money to reclaim more by a filling of from 20 to 40 feet deep, which would be under similar restrictions where formed. I may mention that, in the Victoria Dock, London, the plan of jetties was adopted as likely to answer all the purposes required, and being much less expensive than a continuous wall, although there the ground had to be excavated, whereas here it would have to be formed.

7. But there are objections to the adoption of the plan of a wharf wall which must, I think prohibit its use even if it had much greater advantages than those admitted. A design which most cautious Engineers, acquainted with the habits of the Hooghly, would consider safe, is enormously expensive. The time within which it could be done is absolutely uncertain. And lastly, if it were done, there is, at least, a possibility of failure, and failure of a class which would be most difficult to remedy. I believe a wharf wall, to be reasonably safe, should be founded at

least 60 feet below low water mark. I am aware that plans have been submitted for the work to be founded at a very much higher level; but I should be afraid to build a wall carried out according to these designs. It is a fact that parts of the river which are within the limits of the Port, are now scoured out to a depth of over 50 feet below low water, and this too when the current was not aided by any such structure as an upright wall in deep water along which to scour under the most favorable conditions possible; with such an aid, I can see no reason why it might not scour deeper than it has done without it, down to something firmer. The borings made by the East Indian Railway Engineer, and especially the wells sunk at Howrah and Armenian Ghaut, show that there is no material in the bed of the river which could offer any reasonable resistance to a severe scour until a depth of over 60 feet has been reached; and it is the opinion of Mr. Power, the Chief Engineer of the Railway—decidedly the best authority on this particular subject in India, or, I believe, in England—that nothing above the depth noted would be safe. There is only one way of getting foundations down to this level, that is by sinking cylinders and building the wall on them, and by far the cheapest material to use for this purpose is brick-work,—large brick wells sunk to the required depth for a foundation, and a brick wall from low water mark up as a superstructure. A wall built in this way, with the proper coping of stone, &c., could not be carried out under a cost of about £100 per foot run, or about six times the cost of a series of jetties and a sloped bank; but I believe no contractor would take it even at this rate, and what it would really cost, it would be difficult to say. It can well be understood that a work requiring such a depth of foundation should be carried out under great difficulties: it is impossible to say how long it may take to sink wells to such a depth; some go down tolerably rapidly, some will hardly move at all; a disaster with one or two wells would cause very great delay to a large portion of the work; in fact, it would be as difficult to fix a time within which such a work could be completed, as it would be to fix the cost of it; and lastly, I should be in constant fear for its safety when done. Mr. Power thinks it would be perfectly safe if sunk some 10 or 15 feet lower, that is 10 or 15 feet into the stratum of clay; and I can see no reason to disagree with him; but the fact is, we have no precedent whatever for such a work; there is not a single instance on record of a wharf wall being undertaken under anything approaching to similar difficulties—the Thames embankment, or the Liffey wharf wall, or even the Mersey dock walls, are really trifles compared to it. Now, although this may not be, and indeed is not, a sufficient reason why such a work should not be undertaken, if it were absolutely unavoidable, it is, I submit, a very strong reason why it should not be undertaken if something much less difficult can be adopted, which will answer moderately, although not equally, well, and hence I think the idea of a wharf wall must be set aside. I have said so much on the subject, because I know that many consider a wharf wall to be the proper thing, and because I feel myself that its adoption would be downright folly.

8. There now remains only the question of jetties to consider, and jetties, I believe, are pecu-

liarly well adapted to the circumstances of the case; they are light, and have a good bearing surface on their screws,—this suits the weak bed of the Hooghly; they can be lengthened, or shortened, or altered in position,—which answers the shifting nature of the channel; they offer little resistance to the stream or to a storm wave; and they can be arranged so as to answer every possible demand as to the convenience of shipping and unloading; while at the same time they can be constructed at a moderate cost, and within well known limits as to time. Therefore I think they are the proper class of work to adopt as an experiment, but so arranged that they may form part of a general scheme of jetties and sloping bank, with steam cranes, tramways, bonded sheds, and, ultimately, warehouses, as I feel certain that a line of such jetties, with a few floating wharfs at the up stream end to accommodate steamers and vessels to which time will be of great importance, will be the main scheme for the river bank works.

9. As to the class of jetty, I am in favour of wrought iron screw piles sunk at least 20 feet into the bed (screw piles cannot be sunk much deeper), and so braced above low water that a ship may touch without injuring them. Mr. Power would put cylindrical piles outside, because they can be sunk deeper; he fears that 20 feet is not safe for the screw piles. If the fact of having them sunk only 20 feet, really involved the question whether a great work would stand or fall, I should adopt the cylinders, if I thought them safer, because, then no risk whatever should be run; but with iron screw pile jetties, even if the bed should cut to the very screw of the pile, no sudden failure would occur; the outer row of piles would hang on until the failure could be remedied. It is, however, extremely unlikely that any important cutting would take place, the invariable tendency of jetties erected in the Hooghly having been to cause silting up. There is certainly no tendency whatever to cutting along any part of the left bank of the river from Nimtollah Ghaut down to the Dockyard at present; and if the bank be properly sloped, no important obstruction offered to the current, and no great changes allowed to take place higher up, there are no grounds for fear of cutting in this portion of the river. Screw pile jetties would offer no such obstruction; it is easy to guard against change as high up as Chitpore, and hence I believe wrought iron screws sunk down to a depth of 20 to 25 feet below bottom would be perfectly safe. But taking the worst view of the matter, the risk to be incurred in making the trial is not great. There is decidedly much more danger of silting up than there is of cutting in the Hooghly—this is how most jetties have suffered—but in this case too, the wrought iron screw piles offer less inducement to silting than any other form. With vessels pretty constantly lying by them, they would not be likely to silt at all. However, if silting should follow, some artificial means must be adopted to keep the parts about the heads deep; dredging would of course be effectual but expensive.

10. Regarding the dimension of the jetties and their distances apart, I thought at first that it would be sufficient to make them large enough to unload from one hatch of vessels at a time, in which case a head of 35 or 40, and roadway of 15

feet, would be ample. I have, however, lately been discussing the question with ship captains and others, and they say that it is often of much importance to be able to load into two hatches at the same time. To allow this to be done, a length of head of 100 feet would be necessary, and as it seems to be desirable to give the accommodation, it will, I think, be well to have each alternate jetty of 100 feet head. If they be placed 300 feet apart from centre to centre, there will be 60 feet between any two ships lying along the head, which should afford ample room for boats to pass through. It was proposed by Colonel Beadle as Secretary to the Government of Bengal that an ope of 30 feet should be left between two rows of piles, to allow boats to pass up and down without going outside; this was done however when it was contemplated to give the work over to a private company, and it was done with the object of preventing them from making a monopoly of the shore as well as of the pier head; but now that the work is in the hands of the Trust, which can have no desire to hamper trade, and will have the power of forcing vessels to load and unload at their jetties, there does not appear to be any necessity to make such provision, it could only be useful for boats using the ground between the jetties, and it will not be at all necessary, or desirable, that they should use these particular portions as there will be room enough for them elsewhere. The ordinary ope between the rows of screw piles would be about 45 feet, sufficient to permit most cargo boats and all small boats to pass, and considering the circumstances under which the jetties are now to be constructed I believe it will be found ample. The provision of a 30 feet ope would add considerably to the cost and would diminish the strength of structure.

11. I have given much consideration to the question of the best site on which to erect the first set of jetties. It seems to have been pretty well decided that the buildings to be erected in connexion with them are to be bonded. It also appears to be a settled point that it would be an advantage if it were not necessary that all goods should be crowded on to the small patch of ground opposite to the Custom House. If these opinions are correct, I think general convenience will be best consulted if the first set of jetties were erected a short distance from that building, the boats might then use it and the Bonded Warehouse fronts without interruption. A very convenient place for four or five jetties is from the north end of the Bonded Warehouse to a point near the Railway Ghaut, the arrangement would, however, involve the removal of the inland Steamers to berths above the Railway Ghaut, but there is no doubt, that that is the best situation for them; they now occupy deep water berths, which might be occupied by ships, the ground above the ghaut cannot be so occupied, but it is deep enough for the accommodation of River Steamers. This, however, is more a question of general convenience than an engineering one, the Committee may therefore wish to decide it themselves.

12. In connexion with the jetties the necessary cranes, tramways and buildings must be considered. I think the unloading arrangements should be the best of the kind, that is good jetty steam cranes, capable of lifting weights of two or three tons, and of hoisting or lowering at the rate of from 15 to 20 tons per hour. The buildings should be capable of accommodating the whole of

the cargo to be landed by the jetties, for such a length of time as it would be necessary for it to remain in them. They should be surrounded by a proper wall or railing, and tramways should run from the cranes direct into the buildings. This is the class of arrangement which I recommend.

13. If the steamers are to be moved to the upstream side of the ghaut, some special accommodation should be provided for them there; indeed wherever they load and unload an improvement in the means of doing it is as much needed in their case as in the case of any of the vessels frequenting the port, and there is, perhaps, as much to be gained by providing them with the necessary conveniences. For the present, two jetties would afford sufficient accommodation, they may be somewhat lighter and smaller than those proposed for shipping, and as they will be in shallower water they will be much cheaper, 35 feet head and 12 feet roadway will be ample. They should be provided with light steam cranes and tramways, and I believe that store houses should be erected on the ground opposite them, of which there is a large quantity available. At any rate, if stores cannot be erected, landing sheds should be. I do not desire to enter on a discussion as to whether we have the right to erect buildings on this ground or not, but there can be no doubt whatever that if a decision be come to that the ground which has been reclaimed from the river cannot be utilized to meet the demands of trade, but must be left a comparatively useless if not an offensive waste, it will be a most unfortunate one for the cause of improvement, and of the welfare of the trading community. There is ground enough between the Railway Ghaut and Ahery-tollah Ghaut to accommodate a very large trade. It has hitherto been a nuisance, it is now barely harmless, whereas if it be properly utilized, it may become the site of a most valuable improvement and a very large source of revenue for the Trust or the Town.

14. It now remains to consider the accommodation to be provided for the country boat trade, and I fear that my views on this question, as well as that of the quay wall, may be considered behind the times. I have really given this part of the project a good deal of attention, I have made enquiries from practical men; from those who have a most abundant opportunity of observing the manner of loading and unloading, and I have spent a considerable time making observations myself. The conclusion which I have arrived at is, that of all the means which we can provide for loading and unloading the produce carried in country boats, the most convenient and practicable, for the greater part of it is to provide a good sloped bank, made easy for coolies to ascend and descend, and allow them to carry the bags and bundles on their heads. I am quite satisfied that this is cheaper and on the whole better than wharfs or jetties, even if provided with steam cranes, hydraulic cranes, or hand cranes. It does not follow in the slightest degree that because such an arrangement is good for country boats, it must be good for cargo boats bringing cargoes to and from vessels. The country boats come up direct to the bank with their cargo, generally consisting of portions of jute or rice or seeds of a maund or two in weight, which a man or two can carry with ease. The difference in the case of ships unloading by boats need not be pointed out. The Committee must not consider that because a

series of jetties is considered unnecessary, nothing is required to be done for the up-country trade; on the contrary a great deal is required, and nothing can be more reasonable than to make the boats pay for the accommodation given to them. At present they ground on a mud bank; they have to carry the cargo through mud often more than ankle deep for a distance of from 50 to 100 yards, and then up a bank of any shape but the right one. This should be all altered, the slope should be carried out to low water, it should be well made with brick ballast, neatly rammed and smoothed, so that the coolies could walk on it easily and comfortably, and then it should be kept clean from mud and dirt, and for such accommodation boats may very well pay. A couple of small screw pile jetties, or a screw pile and a floating jetty, might be erected at the most convenient places to accommodate boats carrying heavy cargo, and as an experiment in the way of providing such accommodation for this class of traffic one jetty might be provided with a small steam crane, the other with hand cranes.

15. As an immediate relief to the boat trade and a source of income for the Trust, the roads now being made by Mr. Wallace might be run down to dead low water; the metal carried down to the same level, and the whole rammed and smoothed so as to make it easy for coolies to move on, and other roads might also be run down in the most favorable positions for the work. The boats should then make use of them as ghants, and they should be charged for the use.

16. But the way in which the greatest amount of accommodation can be given to the boat trade is, by erecting suitable godowns on the, now useless, land along the river bank. The sum of money which is expended in carting the produce away from the river to the gullies and narrow streets of the town is enormous. Carts have to pass through narrow lanes where they are sometimes at a dead lock for hours, then the produce has to be carried by coolies through all sorts of passages after it has been carted as far as possible; and at last it is stored in godowns for which very high rents are paid. Of course the same round has to be gone through when it is being shipped. This could, and I suppose would, all be avoided if the means were given of storing on the bank. The buildings must be such as would enable the mahajuns to lock up and protect their goods—open sheds of whatever kind would not answer—they may be simple, and comparatively inexpensive, of only one story if there be an absolute necessity for confining them to that height, but they must be closed. There appears to be an idea afloat that open sheds such as the Customs sheds may be built, but that the air of the river must not be shut out by closed buildings. Now if the open sheds be good for any thing, they will be filled with produce, and when filled they must obstruct the passage of the air as much as if they were closed by doors and windows, so that really the difference between open sheds and close sheds is more imaginary than real. If it be considered of great importance to provide for the passage of air from the river to the strand road, it can be best arranged by placing the building in double rows, extending from the river towards the road; say a roadway of 30 feet then a space for a building of 60 feet, another road, and so on, thus air passages and the greatest amount of accommodation for trade would both be provided. Here again, as a

source of immediate income, if some temporary buildings were run up on each side of the roads being made by Mr. Wallace, secure enough to be used as stores by native merchants, they could be let out at once for that purpose and at a very remunerative rate.

17. Whatever work may be done in this portion of the river for the accommodation of the boat trade on the plan described, would be all in the right direction whenever it may become necessary to extend the shipping of the port up to it. I have no doubt that the shoal which extends from the Railway Ghaut up to Aherytollah Ghaut can be easily removed when it becomes necessary to do so; indeed the very work proposed of raising the low land which lately formed part of the bed will help to remove the remainder of it.

18. I submit herewith a short description of the works which I propose for the purpose of the kind of preliminary project desired by the Committee, and a rough, but I think covering estimate of the cost. The works proposed are hardly of a "temporary kind" as noted by the Committee; but they are of a kind that, while they will stand for a long time if desired, yet they can be easily removed if such a course be found necessary hereafter. No drawings have been prepared, because, 1st, it would have delayed the submission of this paper for a long time, if it had been kept back until they were ready; and next, until the project or some project is definitely approved of, it would be waste of time to prepare drawings. What is proposed can be understood without them, and the preparation of the drawings need not delay the commencement of the work, if it be approved. Meantime a survey of the bank is being made and a design for a jetty is being prepared.

H. LEONARD,  
River Trust Engineer.

BONDED WAREHOUSE, }  
The 28th November 1866. }

#### SUMMARY OF PROPOSED WORKS

AND  
ROUGH ESTIMATE OF THEIR COST.  
*Accommodation for Shipping between the Bonded Warehouse and the Railway Ghaut.*

Two wrought iron screw jetties, extending into 25 feet water at low tide, 300 feet apart from centre to centre; roadway 15 feet; heads 45 by 30, fitted with a two ton steam crane moveable on a line of rails along the head. Two lines of rails to run from the head to the bank; four two tons and four one ton trucks. ... Rupees 1,20,000 0 0

Two ditto ditto only with heads 100 by 30 feet, fitted with two cranes each, ... Rupees 1,60,000 0 0

Four double sheds of 100 feet by 60 feet by 25 feet, brickwork foundations and walls; sides to be a series of large oves, closed by railing or railing gates. Rails from each jetty to run up to and pass through the sheds ... Rupees 96,000 0 0

Strong iron railing to enclose the whole, having a passage of 30 feet between the railing and the river ... Rupees 20,000 0 0

One building for the residence of the Manager and Assistants ... Rupees 30,000 0 0

Sloping and paving the whole of the bank ... Rupees 15,000 0 0

Total for shipping, ... Rupees 4,41,000 0 0

*Note.—The Jetties accommodation will unload about 1,000 tons per day. The buildings are only intended to be used as bonded sheds.*

*Accommodation for Inland Steamers north of the Rail-way Ghaut.*

Two wrought iron screw pile jetties ; extending into 10 feet water at low tide ; 300 feet apart from centre to centre ; roadway 12 feet ; heads 35 feet by 25 ; feet fitted with 30 cwt. steam cranes, moveable on line of rails along the head ; two lines of rails to extend from the head to the bank ; four 30 cwt. and four 15 cwt. trucks	... Rupees	80,000 0 0
One double building 100 feet by 60 feet by 25 ; feet a line of rails from the ghaut to run down each front	... Rupees	24,000 0 0
One small building as residence for an assistant wharf master, who can also attend to the boat jetties	... Rupees	15,000 0 0
Sloping, filling and paving the bank	... Rupees	5,000 0 0
Total for accommodating Inland Steamer	... Rupees	124,000 0 0

*Accommodation for Inland Country Boats between the Mint and Aherytollah Ghaut.*

Filling, levelling, and sloping the whole line of bank, paving and metalling the slope	... Rupees	60,000 0 0
Two small screw pile jetties, one above night soil ghaut, and one near Prosunno Coomar Tagore's Ghaut, extending into 6 feet water at low tide ; heads 30 feet by 20 feet ; roadway 10 feet, one to be fitted with a one ton steam crane, the other with one 10 cwt. hand crane ; lines of light rails to extend from the roads to the nearest shed	... Rupees	40,000 0 0
Three double stores 100 feet by 50 feet by 20 feet each ; walls brick, roof corrugated iron or brick work	... Rupees	45,000 0 0
Total for accommodating boat produce	... "	145,000 0 0
Grant Total Accommodation	... "	710,000 0 0
Add Contingencies 10 per cent.	... "	71,000 0 0
Superintendence 8 ditto	... "	56,800 0 0
Grand Total	... "	837,800 0 0

H. LEONARD,  
River Trust Engineer.

BONDED WAREHOUSE,  
The 28th November 1866. }

Note by H. LEONARD, Esq., to accompany his Report on the means proposed for the improvement of the Strand Bank.

I have said nothing in my report as to the necessity for the jetties. I supposed this to be admitted, the Committee having ordered me to consider the means of providing them. I have discussed the class of accommodation which should be provided, whether wharf walls, floating wharves, or pile jetties, with the best means of providing this accommodation. The following remarks might, however, be added to the 1st paragraph of my report, viz :—

2. It is useless to discuss the question of the necessity for accommodation for loading and unloading vessels, the two Committees which have reported on the subject being unanimous as to the great want of such accommodation. The efforts which have been made by two separate Companies and by the firm of Messrs. Brassey and Wythes to obtain the privilege of erecting works, and the support which they received from the whole mer-

cantile community, go to confirm the views of the Committees ; while a visit to the river bank the sight of crowds of boats stranded on the mud, piles of goods battered and dirty being rolled along, heaps of debris of broken crates of delft, burst casks of bottles and shattered cases of finer ware, must convince the most incredulous that the crying want of the trade of the port is the means of loading and unloading exports and imports, and the fact of your Committee having been appointed to carry out the work shews that Government are fully alive to the necessity of action.

3. I would also suggest the following addition to the last paragraph of my report, viz :— Although it is not really necessary to enter into the question of income now, it may give confidence, if it be made clear, that a large return is almost certain to follow the construction of these preliminary works. This question was discussed in my report for the fortnight ending 31st May last, an extract from which I beg to subjoin :—

a. THE BANK ALONE.—The ground now formed, or in process of being formed, and which can be completed in a few months, if let out on leases for three years with the privilege of building cheap sheds on a defined plan, would produce a rent of at least Rupees 1,00,000 per annum. The project for providing accommodation for country boats, if completed as intended, and a rate of 8 annas per ton charged on all boats unloading, would produce Rupees 3,00,000 per annum. The project for providing accommodation for river steamers, when complete, if a charge of 1 Rupee 4 annas per ton be made for unloading and running into sheds, would produce over Rupees 1,00,000. The project for the accommodation of ships, when complete, if a charge of Rupees 2 per ton be made for unloading, passing into Customs sheds, and passing out again to port, would produce Rupees 4,00,000 per annum, making a total income of Rupees 9,00,000.

b. The following are the data from which these results have been obtained. The Strand Bank, reserving the ground required for the sanctioned project for steamers and sea-going vessels, the whole of the bank south of the Custom sheds for the accommodation of cargo boats, all the public ghauts for the public use, and 100 feet wide along the whole edge of the bank for the boat traffic project, there would remain over 1,200 cottahs of land available to let on three years leases. The rent now obtained, when no leases can be given and no building of any kind are allowed to be erected, is over 10 Rupees per cottah per month, say Rupees 120 a year. Supposing, however, owing to the larger quantity available, that only Rupees 100 per cottah would be obtained, and that only 1,000 of the 1,200 cottahs would be let, the income would be  $100 \times 1,000 = 1,00,000$  Rupees per annum. I am aware that all the ground cannot be let now ; but parties object to take it, first because they cannot get leases, next because they cannot erect any covering for the goods which they store on it. There seems to be no good reason why both these privileges should not be conceded for three years ; if so, I believe all the ground would be taken. This calculation, too, is on the supposition that matters remain as they now are ; but if the boat accommodation project be carried out, and that all boats must unload between the Mint and Aherytollah Ghaut, the ground would be in much greater demand, and would, I think, let at higher prices.

c. THE PROJECT FOR BOATS.—I have been furnished by the Collector of Nuddea Rivers and the Collector of Canal Tolls with a return shewing the number of laden boats which come into the river in a year. This return gives 1,200,000 tons. It is, however, known from accurate experiments that the canal and river measurements give 35 per cent. more than the true quantity actually carried by the boats, thus reducing the total to 8,00,000. I assume that all the cargo is landed in Calcutta, I don't know where else it can go to; but in order not to over estimate, I deduct  $\frac{1}{4}$ , leaving 6,00,000 tons to be landed; and as all boats must use our accommodation, and as I think that we shall have accommodation for all, I take credit for the whole quantity. The limit of rate fixed by the Act for country boat produce is 12 annas; but taking it at 8 annas the result will be Rupees 8,00,000. It would, of course, increase or decrease nearly in proportion to the rate really charged.

d. RIVER STEAMER PROJECT.—In calculating the income from the river steamers, I must be guided by what we can undertake to do, the accommodation provided not being sufficient for the whole trade of the Port. Each of the river steamer's cranes should, and indeed will, lift 200 tons a day. I assume, however, that the two will lift only 300 tons a day, and that they will work for 250 days a year, this would give 75,000 tons per annum. The limit of rate fixed by the Act for unloading steamers is Rupees 2 per ton; but taking it at only 1 Rupee and 4 annas, the result would be say Rupees 1,00,000.

e. PROJECT FOR SEA-GOING VESSELS.—In the case of sea-going vessels, I calculate that five steam cranes will unload only 800 tons a day, although it is well known that they could raise 1,000, and I take the number of working days again at 250, which gives 2,00,000 tons per annum. The Act fixes the limit of charge to Rupees 3 per ton, taking  $\frac{2}{3}$  of this as in the other cases, the income would be 4,00,000 of Rupees; of course these incomes only would increase or decrease in proportion to the rate charged.

f. THE WHOLE COST OF OUT-DOOR ESTABLISHMENT.—Engineering and superintending, fuel, &c., could not be more than Rupees 80,000 per annum, so that it appears the income of the Committee may be considerable, if they can carry out this first part of the project.

(Sd.) H. LEONARD, C. E.,  
Offg. Supdg. Engr., South-Eastern Circle.  
CALCUTTA,  
The 18th November 1867.]

From COLONEL J. E. T. NICOLLS, R. E., Secretary to the Government of Bengal, in the Public Works Department, to the Secretary to the Government of India, Public Works Department,—(No. 59 M., dated the 4th December 1867.)

WITH reference to previous correspondence regarding the measures which should be adopted for the improvement of the Port of Calcutta, I am directed to submit, for the consideration and

\* With three estimates—  
For constructing an iron screw pile jetty, with 105 feet head.

For constructing an iron screw pile jetty, with 45 feet head.

For constructing a timber screw pile jetty, with 105 feet head.

orders of the Government of India, the accompanying memorandum\* by Mr. H. Leonard, C. E., Officiating Superintending Engineer, South-Eastern

Circle, which has been drawn up in consequence

of a suggestion made by Colonel Dickens, Secretary to the Government of India, at a Meeting recently held in the Office of the Chief Engineer of Bengal.

2. The construction of wooden jetties on the Hooghly Strand Bank was suggested by Colonel Dickens as a measure likely to be more immediately beneficial to the trade of the Port, and consequently to give more immediate and general satisfaction to the Mercantile Community than the erection of iron jetties. It will be seen, however, from Mr Leonard's Note (of which a copy has been forwarded direct to Colonel Dickens) that he is of opinion that the benefit to be derived from wooden jetties would not be great; while the expense of their construction would be considerable, and its inevitable result would be the deterioration of the River Bank and general dissatisfaction. In this opinion the Chief Engineer entirely concurs with Mr. Leonard, and the Lieutenant-Governor would therefore deprecate the construction of wooden jetties; while strongly supporting the erection, as soon as possible, of iron jetties on screw piles, with 105 feet length of head, as the only means of giving the experiment a fair trial. It may be further remarked that the silting action described by Mr. Leonard in the 6th paragraph of his Note would not take place in the case of a jetty on screw piles.

Memorandum from H. LEONARD, Esq., c. e., Officiating Superintending Engineer, South-Eastern Circle,—  
(dated the 30th November 1867.)

As requested by Colonel Dickens and the Chief Engineer, I submit estimates for the construction of jetties on the Strand Bank:—

1 For constructing an iron screw pile jetty with 105 feet length of head.

1 For constructing a similar jetty with 45 feet head.

1 For constructing a timber jetty of 105 feet head.

2. The cost of the screw pile jetties is founded on the rates at which Messrs. \* \* \* would do the work. That of the wooden jetty on local rates collected in the Office.

3. The iron jetty, if ordered at once, would be erected by the 1st of January 1869. The wooden jetty could probably be done in six months from the date of giving orders; but the arrangements of steam cranes, rails, sheds, &c., could not be in working order before November or December 1868.

4. While there can be no room for doubt, but that wooden jetties, even without steam cranes, &c., would be of much use to the shipping, it is equally certain that the value of a jetty without these appliances would not be more than one-fourth that of one well furnished; while one would earn seven or eight hundred Rupees a day, the other would not earn more than from one hundred and fifty to two hundred.

5. It is difficult to draw a comparison between iron and wood as to their durability; indeed it is hardly necessary to do so, as the wooden jetty is not expected to form a permanent arrangement; but it is difficult even to fix, with moderate accuracy, a time which the wooden jetty is likely to last: it may be destroyed by the toro of the river in a year or two, as in the case of the Alipore Bridge; while it may last for several years, the jetties at Hastings having stood tolerably well for six or seven years.

6. The great objection, however, to a wooden jetty in the Hooghly, especially in that part of the Hooghly where it is now proposed to erect jetties, between the Custom Sheds and the Railway, is the effect which they produce on the bank causing a deposit of mud about the piles, which renders the work useless in a few years. Whenever a jetty has been erected, from Hastings up to the Railway, on either side of the river, silting has followed rapidly, and to such an extent that no vessel larger than a cargo boat can lay by them: just north of the very ground on which the jetties are now to be erected, the Railway Ferry landing is dry at low water, the steamer being unable to use it except by the aid of a floating jetty attached. This silting not only renders the jetty itself useless, but it forms a permanent injury to the line of the bank, making it more difficult to deal with the erection of a good line of permanent works hereafter.

7. The question to be decided then is this. Is it worth while to run the risk of failure,—failure by the destruction of the jetty itself, by having it rendered useless from silting, and by injuring the river bank for some distance above and below, for the sake of having the use of one or two jetties for six or seven months, doing only one-fourth of the work which well appointed jetties can do, and that too at very great cost, for although the exact time which a wooden jetty will stand cannot be definitely fixed, it is certain that it will not last many years.

8. There is an objection to trying such an experiment just now, which, though it may not be of very great importance, will probably be thought worthy of consideration. It is this,—the question of providing accommodation for the shipping has now been under discussion for several years, people have been on the tip toe of expectation that something worthy of the trade of the port would be undertaken: they have been expecting it so long, that a few months more or less would hardly be noticed; but now that this Department has taken it up, the plans will be watched with suspicion, every fault will be magnified, and it would very seriously shake confidence in future projects, if a commencement be made with work which may, and probably will be, a failure: the Public Works Department is certain to receive volumes of abuse, and every one connected with the work will get his share of it, whether he merits it or not.

9. On considering the matter as carefully as I can, I am decidedly of opinion that the money spent on erecting wooden jetties to give temporary relief to the shipping would not be well spent, the relief afforded would not be sufficient to produce any sensible effect on the trade of the port, while the effects of an incomplete arrangement in the commencement would be to shake confidence in the whole project. I therefore recommend that the iron jetties be erected as soon as possible, and that no steps be taken to put up wooden ones in the meantime.

10. If, however, it be determined to erect wooden jetties, then I recommend that they be placed south of the Custom-house Sheds, or directly opposite to them, and not in the sites on which it is proposed to erect the set of four iron jetties.

### 105 FEET HEAD.

#### ESTIMATE No. 1.

Estimate framed by H. Leonard, Officiating Superintending Engineer, South-Eastern Circle, of the probable expense of constructing a wrot iron screw pile jetty.

#### SPECIFICATION.

*Wrot Iron Screw Pile Jetty.*—Neck 15 feet between piles, 21 feet wide on planking, T head 30 feet wide and 105 long, all piles in T head 6 inches diameter, cast iron screws 3'-6" diameter, wrot iron longitudinal girders 15' x 1' 3" x 7 $\frac{1}{4}$ , cross girders 9" x 7 $\frac{1}{4}$ , longitudinal girders to bear 8 tons at centre and cross girders 3 tons.

Quantity.	Items.	Rate.	Amount.	Total
73 8 ton	Wrot Iron Piles ..	Rs. As. P. @ 870 0 0 p.tu.	27,308	Rs.
12 0 "	Cast Iron Screws ..	" 370 0 0 "	4,440	
17 09 "	Wrot Iron Girders ..	" 870 0 0 ..	6,324	
3 53 "	A. Breastplates ..	" 870 0 0 ..	1,306	
2 12 "	Racking Ties and Bolts ..	" 870 0 0 ..	784	
30 9 "	Wrot Iron Clasp with bolts complete ..	" 370 0 0 ..	11,433	
26 98 "	Cross Girders and Bracing Plates ..	" 370 0 0 ..	9,975	
3 0 "	Channel Iron ..	" 370 0 0 ..	1,110	
13 15 "	Cast Iron Caps ..	" 200 0 0 ..	2,630	
2,283 c. ft.	Nails ..	" 2 8 0 p. ft.	8,689	
2 3 ton	Crooseted Fir ..	" 8,703 0 0 each	7,400	78,200

### 45 FEET HEAD.

#### ESTIMATE No. 2.

Estimate framed by H. Leonard, Officiating Superintending Engineer, South-Eastern Circle, of the probable expense of constructing wrot iron screw pile jetty.

#### SPECIFICATION.

*Wrot Iron Screw Pile Jetty.*—Neck 15 feet between piles, 21 feet wide on planking, T head 30 feet wide and 45 long, all piles in T head 6 inches diameter, cast iron screws 3'-6" diameter, wrot iron longitudinal girders 15' x 1' 3" x 7 $\frac{1}{4}$ , cross girders 9" x 7 $\frac{1}{4}$ , longitudinal girders to bear 8 tons at centre and girders 3 tons.

Quantity.	Items.	Rate.	Amount.	Total
44 2 ton	Wrot Iron Piles ..	Rs. As. P. @ 370 0 0 p.ton	16,364	Rs.
8 4 "	Cast Iron Screws ..	" 370 0 0 ..	3,108	
12 80 "	Wrot Iron Girders ..	" 870 0 0 ..	6,736	
3 0 "	A. Breastplates ..	" 870 0 0 ..	1,110	
1 90 "	Racking Ties and Bolts ..	" 370 0 0 ..	726	
11 19 "	Wrot Iron Clasp with bolts complete ..	" 370 0 0 ..	4,140	
26 96 "	Cross Girders and Bracing Plates ..	" 370 0 0 ..	9,975	
2 10 "	Channel Iron ..	" 370 0 0 ..	777	
11 13 "	Cast Iron Caps ..	" 200 0 0 ..	2,226	
1,600 c. ft.	Nails ..	" 2 8 0 p. ft.	4,032	
2 3 ton	Crooseted Fir ..	" 8,700 0 0 each	7,400	54,584
	Add contingencies @ 6 per cent. ..	.....	.....	2,729
	Total ..	.....	.....	57,313

## 103 FEET HEAD.

## ESTIMATE No. 3.

Estimate framed by H. Leonard, Officiating Superintending Engineer, South-Eastern Circle, of the probable expense of constructing teak wood jetty.

## SPECIFICATION.

**Teak wood Jetty.**—Neck 15 feet between piles, 21 feet wide on planking, T head 30 feet wide and 105 long, all piles 15" x 15", teakwood longitudinal girders 15" x 12", cross girders 12" x 8", longitudinal girders to bear 8 tons and girders 3 tons.

Quantity.	Items.	Rate.	Amount.	Total.
		Rs. As. P.	Rs.	Rs.
2,939 83	Cubic feet of teak wood piles, including fixing	... @ 4 8 0 p. ft.	13,220	
4,144	Cubic feet of teak wood girders, including fixing, &c.	... 3 8 0 "	14,604	
6,717	Superficial feet of Zinc Sheetings, including spelter nailing	... 0 0 0 "	2,519	
Mds. Srf.				
77 17	Wrot Iron bolts, including fixing, &c.	... 14 0 0 p.m.	1,084	
100 0	Wrot Iron angle braces and ties, including fixing	... 14 0 0 "	1,400	
	Add contingencies	... 5 per cent	.....	32,736
			.....	1,637
	Total	....	.....	34,373

From COLONEL C. H. DICKENS, R. A., Secretary to the Government of India, Public Works Department, to the Secretary to the Government of Bengal, in the Public Works Department,—(No. 838C., dated the 10th December 1867.)

I AM directed to acknowledge receipt of your letters No. 49M. and No. 59M., dated 18th November and 4th December 1867, respectively, on the subject of certain improvements to the Port of Calcutta. It is reported that the Committee of Justices for the improvement of the Port do not consider it within their power to carry out the works designed for the accommodation of inland country boats in the manner suggested in Public Works Department No. 678C. of 16th September last, and have re-transferred the Strand Bank to the Commissioner of Police, and made over to Government all plans and estimates already prepared in connection with the project. You further submit the recommendation of His Honor the Lieutenant-Governor that the project in

question, which is

	Rs.	estimated to cost
Sloping and paving bank	60,000	
Two screw-pile jetties	40,000	Rs. 1,45,000,* may
Three double stores	45,000	be carried out
Total	1,45,000	

through the direct agency of the Public Works Department. There is also submitted a project for jetties for the accommodation of the shipping between the Bonded Warehouse and the Railway Ghât

estimated to cost

	Rs.	which is the principal object of the letter under reply.
Four screw-pile jetties	2,80,000	
Four double sheds	90,000	
Iron-railing	20,000	
Residence for Manager and Assistants	30,000	
Sloping and paving bank	15,000	
Total	4,41,000	

Registered as No. 104C. of 1867-88.

The Governor General in Council consents to the prosecution of the smaller work as proposed.

In regard to the larger project for the jetties, which the Lieutenant-Governor is very desirous should be carried out with as little delay as possible, I am to state that the Governor General in Council fully concurs with His Honor that steps should be taken to get something done at once towards the removal of the present unsatisfactory system of landing goods; and that this should be done irrespectively of the ultimate arrangement of the general scheme of improving the Port. His Excellency in Council also agrees with the Lieutenant-Governor that Mr. Leonard's proposal to construct jetties is the best to adopt.

It would appear that screw-pile jetties may, under the arrangement proposed, be constructed within a year from the date of the order; but that timber jetties can be built for half the money and within half the time. Such jetties would, however, be less efficient, and could not, in the time mentioned, be furnished with steam-crane. Mr. Leonard also fears that, judging by existing cases, they would cause a deposit of silt, which would in a short time render it impossible for large vessels to be brought alongside. This, it is supposed, would not happen with screw-pile jetties. On this latter point, however, there is hardly sufficient evidence. On the contrary, the presumption is that the resistance to the current opposed by a large jetty of screw-piles would, in positions where there is a tendency to silting action, cause a deposit, though not so rapidly, nor to so great an extent as would be occasioned by the greater resistance offered by timber piles. In both cases, no doubt, means could be found to remove the deposit. If, on further consideration, the Lieutenant-Governor should think it worth while to order the construction of one or more timber jetties, in addition to the iron ones, to secure more immediate relief to the trade, the Governor General in Council will be prepared to sanction the outlay, but it is not desired to interfere with His Honor's decision on this point.

\* \* \*

It will be desirable to invite the tenders both separately for each jetty, and jointly for the whole; and not to confine the invitation to tenders for screw-pile jetties, nor even to iron jetties, so that wooden or other descriptions of designs may be submitted, and their advantages brought to notice. The tenders should specify the period at which each jetty should be completed.

I am to request that a Departmental design and estimate may also be submitted, in order that an indent may be forwarded to the Secretary of State for one or two extra jetties. This will afford security for getting something done in the event of the call for tenders from contractors failing from any cause to fulfil its object.

A formal sanction to the expenditure will be accorded when a report is received of the precise amount required, which cannot be known till tenders have been accepted; but it is to be understood that there will be no delay in according sanction to whatever the Lieutenant-Governor recommends in accordance with the foregoing remarks.

From MESSRS. GLADSTONE, WYLLIE AND CO., to COLONEL J. E. T. NICOLLS, R. E., Secretary to the Government of Bengal, Public Works Department.—(dated Calcutta, the 9th January 1868.)

RIVER BANK IMPROVEMENTS.

BEING practically interested in this question to a greater extent than any other persons in Calcutta, we take the liberty of submitting our views on it for the consideration of His Honor the Lieutenant-Governor, and we think that we cannot more conveniently do this than by taking up the published memorandum by the Hon'ble Mr. Skinner, dated 29th November last, stating the points on which we agree with him and those on which we differ, with our *reasons* in either case.

2. We are completely at one with Mr. Skinner in the view, that any such connection between the Municipality and the agency to which the proposed work of improvement is to be entrusted, as would imply any material degree of control on the part of the former over the latter, is highly objectionable in principle, would prove grievously obstructive in practice, and we also agree with him in thinking it not only *desirable* but *necessary* that Government should afford their assistance freely and liberally if the works are to be prosecuted with vigor or success.

3. But, we differ from him in the opinions he has expressed regarding the proper Constitution of the agency to which the works are to be entrusted, and the system under which any agency which may be appointed should discharge their functions.

4. We think that the best agency would be found in a mixed Board or Commission, consisting in part of officials who might be selected with reference to their special fitness (in a professional point of view or otherwise) for the duties which would devolve on them, and of Merchants who should be chosen with reference to the importance of their stake in the question, prior knowledge of the working of similar operations in England, or the confidence which the Mercantile Community generally would repose in them; the *executive* duties, under the Commission, being entrusted to some *one* competent Officer, who should combine the functions of Superintendent and Secretary. It will be necessary, we conceive, that the Funds for the execution of the works should be supplied by Government in the first instance, but the outlay would, we believe, be found amply reproductive, and the official members of the Commission would be charged with the special protection of the Government interest.

5. Having stated the points on which we agree, and those on which we differ, with Mr.

Skinner, we proceed briefly to record our *reasons* for the conclusions we have arrived at.

And, first with reference to the connection with the Municipality. Experience has proved that such a connection *will not work* and as we cannot see that in a matter which, after all, is far more an Imperial than a Local one, any principle is involved in the connection, *practicability*, we take it, is the true test to apply in its solution. Secondly, as to the assistance which we think Government should afford. We advocate the provision of funds by them and their hearty co-operation, because we believe the works to be admittedly necessary, likely to prove highly reproductive, and because we are satisfied that in no other way will the necessary funds be found available. A Government Guarantee might induce tenders to take up a loan on the security of the revenues to be derived by the Commission, but even this is doubtful, and looking to the desirability of an *immediate* prosecution of the works, we think that the end in view may be most easily obtained in the way we have pointed out, and with little more risk to the funds of the State than would be involved in a guarantee, while a more efficient supervision could be exercised by Government in the former case than in the latter. Thirdly, with reference to the agency to be employed. While agreeing with Mr. Skinner that generally, difficulties must be looked for in the selection of non-official persons, willing and competent to undertake the discharge of duties not immediately connected with their private interests, the present case is one, we think, which would form an exception; inasmuch as the enormous disadvantages of the existing system press so heavily on individuals of the non-official community that many of them would be glad, we conceive, to make a present sacrifice to ensure what must ultimately prove a considerable gain, both in time and in the comfort and security with which their business can be conducted. It would be necessary too, we believe, to the efficient or even the tolerable, working of the scheme that mercantile opinions should be accessible at all times, and these, we think, would be only weighty and reliable, if accompanied by the sense of responsibility attached to seats in a Commission whose instructions, under certain limitations, would be considered final. It would be highly desirable, we think, that the Commission should consist of a very limited number of persons, and absolutely necessary that their Executive should be a man of experience, position and judgment; well paid, and with powers and responsibilities equal to his position.



# SUPPLEMENT TO The Calcutta Gazette.

WEDNESDAY, JANUARY 22, 1868.

## OFFICIAL PAPERS.

*Non-Subscribers to the GAZETTE may receive the SUPPLEMENT separately on a payment of six Rupees per annum if delivered in Calcutta, or twelve Rupees if sent by Post.*

### Results of the Meteorological Observations taken at the Surveyor-General's Office, Calcutta, from 8th to 14th January 1868.

MONTH.	Date,	Reduced Reading of Barometer at 10 A. M.		THERMOMETER.		Daily Range of the Temperature.	Mean Temperature for the day.	Mean Wet Bulb.	Computed Mean Dew-point.	Mean Degree of humidity for the day.	Prevailing Direction of Wind during the day.	Rain.	Max. Pressure of Wind.	GENERAL REMARKS.
		Inches.	○	Highest Reading.	Lowest Reading.									
	8th	30'120	76'3	65'4	10'9	69'9	63'0	62'5	60'60	N	...	...	Clear and scattered clouds. Slightly foggy at 2 A. M., and from 9 to 11 P. M.	
	9th	'077	75'0	60'5	15'5	67'0	59'1	52'8	'62	N N E & N	...	...	Clear. Slightly foggy at midnight.	
	10th	'111	74'7	58'5	16'2	66'2	68'6	52'5	'63	N	...	...	Clear and scattered cirri. Foggy from 7 to 10 P. M.	
	11th	'166	74'5	58'0	18'5	65'4	68'2	52'4	'65	N N W & N	...	...	Clear, and scattered Cirrocumuli. Slightly foggy at 8 and 9 P. M.	
	12th	'177	76'0	58'2	17'8	66'3	50'8	54'6	'68	N	...	...	Clear and scattered clouds.	
	13th	'184	76'5	61'0	16'5	68'2	62'3	57'6	'70	N	...	...	Cirri and Stratocumuli.	
	14th	'171	78'2	62'7	15'5	69'7	63'2	58'0	'68	N	...	...	Chiefly clear.	

The mean Temperature and the mean Wet Bulb are derived from the twenty-four hourly Observations made during the day.

The Dew-point is computed with the Greenwich constants. The figures in column ten represent the humidity of the air, the complete saturation of which being taken at unity. The receiver of the lower air gauge is 1 foot 2 inches, and that of the Anemometer 70 feet 10 inches, above the level of the ground.

The extreme variation of Temperature during the past seven days	...	...	20'2
The Max. Temperature during the past seven days	...	...	78'2
The Max. Temperature during the corresponding period of the past year...	...	...	75'6
The mean humidity during the past seven days	...	...	0'66
The mean humidity during the corresponding period of the past year	...	...	0'75

...	...	...	Inches.
The total fall of rain from 8th to 14th ... { by lower rain gauge	...	...	Nil.
{ by Anemometer gauge	...	...	Nil.
Ditto ditto from 8th to 14th, average of fourteen previous years	...	...	0.11
Ditto ditto between the 1st January and the 14th current	...	...	Nil.
Ditto ditto during the corresponding period of the past year	...	...	0.48

GOPENAUGH SEN,

In charge of the Observatory.

## Meteorological Report up to 7th January 1868.

STATION.	January.	Hour.	Barometer reduced to 32°	THERMOMETER.		Humidity Sat. = 100.	WIND.		Rain.	WEATHER.
				Dry.	Wet.		Direction.	Velocity.		
CALCUTTA.		Inches.	θ	θ					Inches.	
	1st	10	30°161	68	59	83	N N W	...	...	Clear.
		16	30°064	73	62	50	N N W	...	...	Ditto.
	2nd	10	30°185	65	57	58	N N	...	...	Ditto.
		16	30°073	71	61	53	N N	...	...	Ditto.
	3rd	10	30°175	63	57	47	N N	...	...	Ditto.
		16	30°093	71	61	53	N N W	...	...	Ditto.
	4th	10	30°124	68	61	64	N W	...	...	Ditto.
		16	29°931	74	62	47	N W	...	...	Scattered cirri.
	5th	10	30°094	69	65	70	N W	...	...	Cirro cumuli.
		16	29°935	77	69	64	S W	...	...	Clear.
	6th	10	30°061	68	68	100	W	...	...	Stratoni.
		16	29°935	78	69	61	S S W	...	...	Clear.
	7th	10	30°072	73	67	71	N N W	...	...	Ditto.
		16	29°955	78	68	57	N N W	...	...	Ditto.
SARON ISLAND.	1st	9-30	30°081	68	64	79	N	Light	...	Ditto.
		16	30°042	75	71	81	N by W	Light	...	Ditto.
	2nd	9-30	30°110	66	59	63	N by E	Moderate	...	Ditto.
		16	30°049	73	65	62	N	Light	...	Ditto.
	3rd	9-30	30°092	64	58	67	N	Moderate	...	Ditto.
		16	29°938	73	64	58	N	Light	...	Ditto.
	4th	9-30	30°064	67	61	69	N E	Light	...	Ditto.
		16	29°986	74	65	59	S	Light	...	Ditto.
	5th	9-30	30°027	70	64	89	Variable	Light	...	Scattered clouds.
		16	29°944	75	71	81	S	Moderate	...	Clear.
	6th	9-30	30°003	73	72	95	W	Light	...	Scattered clouds.
		16	29°950	78	72	81	S	Moderate	...	Clear.
	7th	9-30	30°018	74	72	90	W	Light	...	Clouds from W.
		16	29°915	78	74	81	S W	Light	...	Clear.
CHITTAGONG.	*1st	9-30	29°902	65	62	83	N	Light	...	Ditto.
		16	29°914	63	64	79	W by S	Light	...	Hazy.
	2nd	9-30	30°035	64	62	88	N E	Light	...	Ditto.
		16	29°932	69	68	84	W S W	Light	...	Ditto.
	3rd	9-30	29°989	68	62	78	N N W	Light	...	Ditto.
		16	29°002	69	65	79	S W	Light	...	Ditto.
	4th	9-30	29°065	64	61	83	N N E	Light	...	Ditto.
		16	29°879	69	66	84	S W	Light	...	Ditto.
	5th	9-30	29°955	65	62	83	N N E	Light	...	Ditto.
		16	29°850	70	65	75	S W by W	Light	...	Ditto.
	6th	9-30	29°952	65	63	89	N E	Light	...	Ditto.
		16	29°860	71	68	85	W S W	Light	...	Ditto.
	7th	9-30	29°954	67	65	89	N E by N	Light	...	Ditto.
		16	29°858	72	70	90	S W	Light	...	Cumuli towards N. and E.
ARTAKA.	1st	9-30	30°084	68	64	79	E N E	Light	...	Fine.
		16	29°075	75	69	72	W	Light	...	Ditto.
	2nd	9-30	30°004	68	65	84	E	Light	...	Ditto.
		16	29°985	75	69	72	W	Light	...	Ditto.
	3rd	9-30	30°060	67	65	80	N E	Light	...	Ditto.
		16	29°948	74	67	67	W	Light	...	Ditto.
	4th	9-30	30°049	66	61	89	N E	Light	...	Ditto.
		16	29°051	73	66	67	W	Light	...	Ditto.
	5th	9-30	30°007	67	65	80	N E	Light	...	Ditto.
		16	29°918	74	67	67	W	Light	...	Ditto.
	6th	9-30	30°014	68	66	80	N E	Light	...	Ditto.
		16	29°925	76	69	72	W	Light	...	Ditto.
	7th	9-30	30°019	70	67	84	N E	Light	...	Ditto.
		16	29°917	78	70	63	W N W	Moderate	...	Ditto.
CURLICK.	1st	9-30	30°162	73	68	78	E by N	Light	...	Scattered cirrostrati and misty.
		16	30°075	75	69	72	E by N	Light	...	Scattered cirrostrati.
	2nd	9-30	30°211	69	64	74	E N E	Light	...	Cloudy with cirrostrati.
		16	30°106	75	65	55	N	Light	...	Clear cloudless sky.
	3rd	9-30	30°203	60	63	70	E N E	Light	...	Unsteady wind and hazy.
		16	30°01	74	65	59	S W by W	Light	...	Clear sky, misty horizon.
	4th	9-30	30°103	68	60	80	S by E	Light	...	Cloudy, very foggy horizon.
		16	29°975	76	65	52	W N W	Light	...	Thin cirri.
	5th	9-30	30°116	67	65	89	S E	Light	...	Clear.
		16	29°983	75	68	68	S E	Light	...	Scattered cirri.
	6th	9-30	30°034	68	66	80	S W	Light	...	Fine heavy fog all night continued until 9 hours.
		10	29°985	74	65	60	S by W	Light	...	Fine.
	7th	9-30	30°119	67	65	69	S W by S	Light	...	Heavy fog continuing since morning.
		16	30°005	76	66	56	N E by N	Light	...	A few thin cirri to W. Cluster of cirrostrati to N., and misty horizon.
MADRAS.	1st	10	30°099	81	68	48	N E by E	12*	...	Fine.
		16	30°004	81	70	55	N E by E	13*	...	Ditto.
	2nd	10	30°125	81	70	55	N E	12*	...	Passing clouds.
		16	30°016	79	70	61	N E	13*	...	Ditto.
	3rd	10	30°110	81	74	70	N E	13*	...	Cloudy.
		16	29°990	81	74	70	N R	12*	...	Passing clouds.
	4th	10	30°073	81	73	66	N R	9*	...	Ditto.
		16	29°982	80	74	70	N E	14*	...	Fine.
	5th	10	30°056	81	73	66	N E by E	9*	...	Ditto.
		16	29°938	80	73	70	N E by E	10*	...	Ditto.
MADRAS.	6th	10	30°087	79	74	77	N N W	7*	...	Ditto.
		16	29°936	79	78	73	E N E	10*	...	Ditto, with passing clouds.
	7th	10	30°047	79	73	73	E N E	8*	...	Cloudy.
		16	29°918	79	73	73	N E	12*	...	Fine, with light clouds.

\* Velocity in miles per hour.

STATION.	JANUARY.	HOUR.	BAROMETER REDUCED TO 32°.	THERMOMETER.			HUMIDITY SAT. = 100.	WIND.		RAIN.	REMARKS.
				DRY.	WET.	Direction.		Velocity.			
ROORKEE.	1st	9-30	29°243	65	52	80	S W	•	•	...	Cloudy morning with few drops of rain.
	16	29°174	66	57	54	N W	...	...	...	...	
	2nd	9-30	29°243	56	52	74	S W	...	...	...	
	16	29°130	65	57	58	Calm	...	...	...	...	
	3rd	9-30	29°200	62	57	71	Calm	...	...	...	
	16	29°116	69	61	60	S W	...	...	...	...	
	4th	9-30	29°118	61	57	76	Calm	...	...	...	
	16	29°038	67	61	69	S W	...	...	...	...	
	5th	9-30	29°119	63	59	77	Calm	...	...	...	
	16	29°030	67	61	69	S W	...	...	...	...	
	6th	9-30	29°170	66	51	68	W	...	...	...	Mornings very cold; ice making in the station going on apace. Days also cold; a fire all day long is very welcome.
	16	29°107	64	51	50	W	...	...	...	...	
	7th	9-30	29°217	54	49	67	W	...	...	...	
	16	29°122	65	55	48	W	...	...	...	...	
DAMPNING.	1st	9-30	23°361	49	41	91	S E by E	Light	...	...	Misty.
	16	23°294	43	42	91	W by S	Light	...	...	...	Ditto.
	2nd	9-30	23°362	42	41	91	E by S	Light	...	...	Scattered cumuli.
	16	23°302	44	42	83	N W by W	Light	...	...	...	Misty.
	3rd	9-30	23°357	45	42	76	E S E	Light	...	...	Clear sky. Frosty morning.
	16	23°239	51	47	74	W N W	Light	...	...	A few thin clouds only.	
	4th	9-30	23°312	45	43	84	S E by E	Light	...	...	A few thin clouds. Frosty morning.
	16	23°246	45	44	92	W	Light	...	...	Misty.	
	5th	9-30	23°288	43	42	91	S E	Light	...	...	Ditto.
	16	23°205	44	43	91	W	Light	...	...	Ditto.	
	6th	9-30	23°253	39	39	100	S E by E	Light	...	...	Ditto.
	16	23°183	50	44	58	S W	Moderate	...	...	Cumuli round horizon and a few thin clouds.	
	7th	9-30	23°420	44	42	83	E	Light	...	...	Clear sky. Frosty morning.
	16	23°170	48	44	70	W	Moderate	...	...	Misty.	
POONAH.	1st	10	29°906	59	53	64	W	Moderate	...	...	Cirri.
	16	29°291	55	52	80	N W	...	...	...	...	Ditto, cumuli.
	2nd	10	29°988	63	58	72	W	Moderate	...	...	Strati.
	16	29°892	60	58	47	N W	Light	...	...		
	3rd	10	29°857	65	57	58	N W	...	...	...	
	16	29°817	72	61	49	N W	...	...	...	...	
	4th	10	29°877	67	58	55	N W	...	...	...	
	16	29°767	74	63	61	N W	...	...	...	...	
	5th	10	29°810	72	63	58	S E	...	...	...	Cumuli, cirrocumuli.
	16	29°718	72	64	62	N E	...	...	...	...	Ditto ditto.
	6th	10	29°840	71	64	66	S W	Light	...	...	Ditto ditto.
	16	29°755	73	63	54	N W	...	...	...	...	Cirrocumuli, strati.
	7th	10	29°901	63	53	47	W	Moderate	...	...	Cirri, strati.
	16	29°815	68	53	29	W	...	...	...	...	Strati, cirri.
DACEA.	1st	9-30	....	66	62	78	N	•	...	...	Light wind. Clear.
	16	?	68	64	79	W	...	...	...	...	Ditto ditto.
	2nd	9-30	....	67	63	79	N	...	...	...	Ditto ditto.
	16	?	68	62	69	N W	...	...	...	...	Ditto ditto.
	3rd	9-30	30°035	64	60	78	N N W	...	...	...	Ditto ditto.
	16	29°900	60	61	73	N W	...	...	...	...	Ditto ditto.
	4th	9-30	....	66	62	78	N	...	...	...	Ditto ditto.
	16	?	68	63	74	N W	...	...	...	...	Ditto ditto.
	5th	9-30	....	67	61	69	N	...	...	...	Ditto ditto.
	16	?	70	61	61	W	...	...	...	...	Ditto ditto.
	6th	9-30	....	66	65	94	W	...	...	...	Ditto ditto.
	16	?	70	67	84	S	...	...	...	...	Ditto ditto.
	7th	9-30	....	70	60	79	N N W	...	...	...	Ditto ditto.
	16	?	72	67	75	N N W	...	...	...	...	Ditto ditto.
Dee. 1867.	28th	9-30	30°086	71	67	80	N E	...	...	...	Light weather.
	16	20°981	73	69	80	E S E	...	...	...	...	Ditto ditto.
	30th	9-30	30°090	73	70	85	N E	...	...	...	Ditto winds and fine.
	16	29°991	73	68	76	E S E	...	...	...	...	Ditto ditto.
	31st	9-30	30°053	72	68	80	E	...	...	...	Ditto ditto.
	16	29°971	73	69	80	E S E	...	...	...	...	Ditto weather.
Jan. 1868.	1st	9-30	30°000	73	68	76	E	...	...	...	Ditto airs and cloudy.
	16	29°901	73	70	85	E	...	...	...	...	Ditto winds and cloudy.
	2nd	9-30	30°128	70	67	84	N E	...	...	...	Moderate breezes and cloudy.
	16	30°023	72	68	80	E	...	...	...	...	Ditto ditto and fine.
	3rd	9-30	30°084	69	65	84	N	...	...	...	Light weather.
	16	29°970	71	67	80	S E	...	...	...	...	Light winds and fine.
FAIR POINT.	4th	9-30	30°081	69	65	70	S E	...	...	...	Light airs and clear weather.
	16	29°938	71	70	81	S	...	...	...	...	Ditto weather.

BENGAL SECRETARIAT,  
The 18th January 1868.

HENRY F. BLANFORD,  
Meteorological Reporter to Govt. of Bengal.



## SUPPLEMENT TO The Calcutta Gazette.

WEDNESDAY, JANUARY 29, 1868.

### OFFICIAL PAPERS.

*Non-Subscribers to the GAZETTE may receive the SUPPLEMENT separately on a payment of six Rupees per annum if delivered in Calcutta, or twelve Rupees if sent by Post.*

#### Execution of Sentences of Flogging passed by Police Magistrates in Calcutta.

From F. J. MOUAT, Esq., M. D., Inspector-General of Jails, Lower Provinces, to the Secretary to the Government of Bengal.—(No. 3743T., dated on Tour, the 14th October 1867.)

WITH reference to the report of the Commission appointed to enquire into the management of the Presidency Jail, and the recommendation of that Commission that Police cases should no longer be sent to the Jail to receive the whippings to which they have been sentenced, I have the honor to subjoin the report of a very objectionable case which has just been submitted by Dr. Lynch.

"I have the honor to bring to your notice, in illustration of the inexpediency of the present system of carrying out at the Jail sentences of corporal punishment ordered by the Police Magistrates in lieu of imprisonment, the case of a boy, named Dil Mahomed, who for a theft was sentenced on the 28th ultimo to receive six stripes in the way of school discipline. The child, whose first offence it probably was, had to be conveyed from the Court to the Jail in the Police Van, in close association with the adult offenders sentenced on the same day, possibly men of the worst character, the effect of whose conversation in the presence of the child could not fail to be injurious. After the infliction of the punishment the boy had to find his way back to his home, which may have been at the opposite end of the town.

"In many instances the offenders sentenced to corporal punishment have been received from the Court at a late hour, the punishment being inflicted by lamp-light, and the prisoner being left exhausted, it may be by fasting and pain, to get back across the maidan and through the town to a distant home."

2. I myself recently witnessed an example of flogging by lamp-light, after which, suffering and much exhausted, the unhappy wretch had to find his way some miles to his home. I have no hesitation in stating that the practice is cruel and

objectionable as regards the recipient of the whipping, and demoralizing in its influence on the Jail. In the stillness of the night the cries of the unhappy man resounded through the adjacent wards and corridors, and the effect upon me was one of much pain and regret that such a duty should be imposed upon the already over-tasked authorities of the prison.

Whatever object the law may contemplate, that of deterrent example upon others is altogether frustrated by the manner in which the whipping is now administered.

The case of Dil Mahomed, referred to above, is one that cannot be too strongly condemned on every ground.

From STEART HOOGH, Esq., Commissioner of Police, Calcutta, to the Secretary to the Government of Bengal, Judicial Department. (No. 1273, dated Fort William, the 24th October 1867.)

IN obedience to the orders of the Hon'ble the Lieutenant-Governor of Bengal, contained in paragraph 12 of Resolution dated 26th August last, on report of the Commissioners appointed to enquire into the management of the Presidency Jail, and the discipline maintained therein, I have the honor to state that I have consulted the Magistrates of Calcutta regarding the execution of sentences of flogging passed by them, and beg to enclose copy of their opinions on the subject, and to intimate that I concur with them in thinking that, as it would be difficult to secure the daily attendance of a Medical Officer at the Police Office to see the sentences of corporal punishment carried out, it is desirable to allow the present system to continue.

Memorandum from the Magistrate of the Northern Division, Calcutta, to the Deputy Commissioner of Police,—(dated the 22nd September 1867.)

THE undersigned, in compliance with No. 1021, dated 31st August, received 4th instant, has the pleasure to forward a memorandum on the subject to which the Deputy Commissioner has directed his attention.

Memorandum by the Magistrate of the Northern Division, expressive of his opinion upon the following paragraph, being paragraph 12 of the Resolution of the Lieutenant-Governor of Bengal,—(dated 26th August 1867.)

12. "With reference to the 9th Section of the Commissioner's Report, the Lieutenant-Governor desires that the Commissioner of Police may be called upon to report, after communication with the Police Magistrates, whether arrangements cannot be made for giving effect on the spot to sentences of flogging passed by the Police Magistrates, instead of sending the prisoners to the Presidency Jail to undergo their punishments there."

1. The proper place for the carrying out of any sentence of whipping is the Presidency Jail, and this view is supported by the opinion of the learned Advocate-General on a reference made to that Officer by Messrs. Roberts and Branson, which is as follows :—

"I think no warrant is necessary beyond the conviction, on receipt of which the Executive Authorities of the Jail must carry out the punishment in the mode provided by law, i. e., by Act VI. of 1864. The Bengal Council could not do anything more than authorise the Magistrates to impose the punishment; everything regarding its infliction depends on the terms of the Act of the Supreme Legislature."

2. It would be most objectionable to have prisoners whipped at the Police Office, where there are many women and children residing.

3. The reluctance now exhibited by some persons, especially females, to attend the Police Courts as prosecutors or witnesses, would thereby be greatly increased. This is not desirable.

4. There is no fitting place within the Police premises for administering the punishment of whipping, and were this otherwise, the vicinity of the most crowded thoroughfare of Calcutta is an improper locality for the purpose.

5. It is not the duty of a Magistrate, nor is it correct in him, to take any part in executing his own sentence. It would be a retrograde step to do so, a falling back into Mofussil habits, which perhaps only obtain for want of more decent appliances, or because a more rational procedure is not readily to be devised for Mofussil Stations.

6. The Magistrate of the Northern Division has witnessed the execution of his sentences of whipping three times, with a view of ascertaining the severity of this mode of punishment.

7. The punishment of whipping, as administered in the yard of the Suburban Police Court, is demoralizing. It may be amusing to some 50 or 60 persons of depraved tastes, who daily (Sundays and holidays excepted) assemble at the gate; but these are scarcely worthy of encouragement.

8. Mr. Jeremiah King, late the Governor of the Presidency Jail, was appointed a Justice of the Peace, that sentences of whipping might be carried out according to law in his presence at the Jail.

9. By paragraph 11 of the Resolution, we learn "that flogging in a Jail must sometimes be had recourse to." It is possible that the shouts and outcries of Police prisoners, while under the lash, may excite convicts who happen to be within hearing of them, but the exciting influence would certainly not be less when the cries proceeded from scourged Jail convicts under punishment for "disorganizing the discipline of the Jail."

10. Any objection to the Jail as a place for executing a judicial sentence of whipping may, with greater force, be based on executive dislike to disagreeable but necessary duty not self-imposed.

From G. C. Scowen, Esq., Officiating Magistrate, Southern Division, Calcutta, to MAJOR W. REVELEY, Deputy Commissioner of Police,—(No. 52, dated Calcutta, the 7th September 1867.)

IN reply to your memorandum No. 1020, dated 31st August 1867, referring me to paragraph 12 of the Resolution passed by the Hon'ble the Lieutenant-Governor of Bengal, dated the 26th ultimo, on the report of the Commissioners appointed to enquire into the management of the Presidency Jail, I have to say that, apart from the obvious objection which exists to inflicting the punishment of flogging in the Police Courts or in the Police compound, situated as these places are upon a crowded thoroughfare and thronged with persons of all descriptions, including women and children, the Presidency Jail is the proper place for the infliction by the Executive Officers of all punishments ordered by the Magistrate in his judicial capacity.

The punishment of flogging must be inflicted in the presence of a Medical Officer and a Justice of the Peace. The present Superintendent of the Presidency Jail, to whom warrants for the infliction of punishment are now addressed, is both a Justice of the Peace and a Medical Officer.

All juveniles sentenced to flogging are flogged in the Court before the Magistrate, but I cannot recommend any change in the practice at present followed in regard to the flogging of adults.

Resolution by His Honor the Lieutenant-Governor of Bengal,—(dated Fort William the 26th November 1867.)

READ again Jail Proceedings for September 1867, Nos. 1 to 11, relative to a report from the Commission appointed to enquire into the management of the Presidency Jail, and to paragraph 12 of the Government Resolution thereon, calling upon the Commissioner of Police to report whether arrangements could not be made for carrying out sentences of flogging passed by the Police Magistrates at the Police Court itself instead of at the Jail.

Read a letter No. 1273, dated the 24th ultimo, from the Commissioner of Police, Calcutta, submitting the report called for.

Read a letter No. 3743T., dated 14th ultimo, from the Inspector-General of Jails, submitting a report from the Superintendent of the Presidency Jail, in connection with the subject.

2. The Magistrates of both the Northern and Southern Divisions state that, in their opinion, the Jail is the proper place for administering the punishment of whipping, inasmuch as the Police Office is situated in a crowded thoroughfare, and its compound is thronged with men, women, and children all day long. Moreover, they think it would be difficult to secure the daily attendance of a Medical Officer at the Police Office to see the punishment carried out. On the other hand the Jail authorities urge that it is a hardship to those sentenced to flogging, especially in the case of juvenile offenders, to convey them to a place so distant as the Jail, and to release them after punishment at night, to find their way as they best can to their homes. The views also of

those under punishment being audible in the Jail at night, are said to have a disturbing influence on the regular prisoners.

3. On the whole the Lieutenant-Governor is of opinion that the present system under which flogging is administered in the Jail should, save in the case of juvenile offenders, be continued. His Honor, however, thinks it desirable that all adult prisoners on whom sentences of whipping have been passed, should be sent as early in the day as possible to the Jail from the Police Court.

4. The Lieutenant-Governor learns from the statement of Mr. Sconce, late Officiating Magis-

trate of the Southern Division, that juvenile offenders sentenced to whipping in his Court, receive their punishment at the Police Office. His Honor hopes that the practice will be acted on by the Magistrates of both Divisions.

ORDER.—Ordered, that a copy of this Resolution be forwarded to the Commissioner of Police, Calcutta, for communication to, and the guidance of, the Magistrates of the Northern and Southern Divisions, and also to the Inspector-General of Jails, Lower Provinces, for his information, and for communication to the Superintendent of the Presidency Jail.

### CALCUTTA PORT FUND.

*Revenue Account for the year ending 31st March 1866-67.*

Dr.	INCOME.		EXPENDITURE.		Cr.				
	Rs.	As.	P.	Rs.	As.	P.			
To Surveying Vessels	76,571	4	0	By Surveying Vessels	2,23,174	6	7		
" Light Houses	57	7	0	" Light Houses	16,243	11	2		
" Bholeahs	16	0	0	" Bholeahs	6,345	12	11		
" Channel Buoys	836	0	0	" Channel Buoys	49,231	13	1		
" Cyclone	80	0	0	" Cyclone	584	0	0		
" Floating Light Vessels	6,731	2	10	" Floating Light Vessels	1,55,245	6	8		
" Diamond Harbour	102	8	0	" Diamond Harbour	2,615	15	3		
" Fire Engine Boat	66	0	0	" Fire Engine Boat	5,477	2	8		
" Fine Account	388	13	0	" Harbour Master's Department	1,63,372	12	2		
" Harbour Master's Department	1,04,735	8	0	" Moorings	1,07,571	15	1		
" Moorings	2,81,308	2	0	" Port Dues	333	0	0		
" Port Dues	1,67,888	3	0	" Screw Pile Moorings	43,586	7	10		
" Revenue of 1864-65	8,346	0	0	" Tank Boat	3,128	14	3		
" Screw Pile Moorings	29,951	13	9	" Wreck and Anchor	33,419	5	6		
" Tank Boat	3,980	4	0	" Kedgeree Port	1,000	12	11		
" Wreck and Anchor Department	41,306	14	8	" Office Establishments	36,774	2	8		
				" Moyapore Magazine	3,604	6	1		
To Balance deficit				" Interest Account	13,355	0	0		
				" Bills receivable of 1864-65, 1865-66, and 1866-67	6,914	2	0		
							8,71,879	2	10
Rupees	... 8,71,879	2	10	Rupees	... 8,71,879	2	10		

MASTER ATTENDANT'S OFFICE,  
The 25th September 1867.

G. H. SIMMONS,  
Accountant for Audit of  
Port Fund Accounts.

H. HOWE,  
Offg. Master Attendant.

### CALCUTTA PORT FUND.

*Profit and Loss account for the year ending 31st March 1866-67.*

Dr.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Cr.				
To Bills receivable of 1864-65, 1865-66, 1866-67									
"	6,914	2	0	By Fine Account	388	13	0		
" Light Houses	16,186	4	2	" Moorings	1,73,736	2	11		
" Light Vessels	1,48,514	3	10	" Port Dues	1,67,555	5	0		
" Surveying Vessels	1,46,603	2	7	" Revenue of 1864-65	8,346	0	0		
" Moysapore Magazine	3,604	6	1	" Tank Boat	851	5	9		
" Bholeahs	6,329	12	11	" Wreck and Anchor Department	7,887	9	2		
" Channel Buoys	46,395	13	1				3,55,785	3	10
" Cyclone	504	0	0	" Stock for net loss	...	...	1,49,623	0	7
" Diamond Harbour	2,518	7	3						
" Fire Engine Boat	5,421	2	8						
" Kedgeree Port	1,000	12	11						
" Office Establishments	36,774	2	8						
" Screw Pile Moorings	13,634	10	1						
" Interest	13,355	0	0						
" Harbour Master's Department	58,637	4	2						
			5,06,388	4	5				
Rupees	... 5,06,388	4	5	Rupees	... 5,06,388	4	5		

MASTER ATTENDANT'S OFFICE,  
The 25th September 1867.

G. H. SIMMONS,  
Accountant for Audit of  
Port Fund Accounts.

H. HOWE,  
Offg. Master Attendant.

## CALCUTTA PORT FUND.

Balance Sheet shewing the state of affairs on 31st March 1866-67.

Dr.

Cr.

	Rs. As. P.	Rs. As. P.		Rs. As. P.	Rs. As. P.
To Advances recoverable	2,314 15 9				
" Bill receivable of 1864-65, 1865-66, 1866-67	77,816 11 2				
To Cash in Bank of Bengal	88,089 2 2				
To Salvage Suspense Account	15,877 5 6				
To Board of Revenue ...	73,927 8 6				
" Value of Floating Stock	20,05,765 12 9				
	22,68,241 7 10				
				22,68,241 7 10	

MASTER ATTENDANT'S OFFICE,

The 25th September 1867.

G. H. SIMMONS,  
Accountant for Audit of  
Port Fund Accounts.H. Howe,  
Offy. Master Attendant.

## The License Tax.

Statement of Amount collected under Act XXI. of 1867 in the Lower Provinces.

		PRESIDENCY.		MOFUSSIL.		TOTAL.	
		FOR THE WEEK ENDING		Reported to close of November 1867.			
		Before reported.	4th January.	11th January.	In December 1867.		
Collections	..	4,45,318 1 6	1,618	2,595 0 0	8,99,268 4,464	13,53,264 1 5	
Deduct refunds	..	22,082 5 7	400	3,452 0 0	85,148 438	61,498 5 7	
Remaining	..	4,23,255 11 10	1,218	..	8,64,123 4,026	12,91,768 11 10	
Deductions (at the Presidency by the Examiner of Claims) from salaries of servants under	Government of India ... Ditto Bengal	27,120 0 0 23,920 0 0	.. 625 15 2	51 7 11 ..	.. ..	27,171 7 11 24,545 15 9	
Ditto at Mofussil Treasuries	..	..	..	..	69,972 800	70,978 0 0	
Ditto at other Local Offices	..	..	..	..	12,100 20	12,120 0 0	
Ditto in Military Department, less refunds, Rupees	2,923 5 4	..	..	..	..	19,951 10 8	
Grand Total	..	4,74,295 11 10	1,918	677 7 1	9,46,195 4,346	14,46,190 12	

## Want of an efficient Meteorological Department in Calcutta.

From J. LINDLEY, Esq., Secretary to the Calcutta Trades Association, to the Under-Secretary to the Government of Bengal,—(dated Calcutta, the 15th November 1867.)

I AM instructed by the Master and Committee of the Calcutta Trades Association, to request you to draw the attention of His Honor the Lieutenant-Governor to the want of a proper and efficient meteorological department in Calcutta, as evidenced during the late Cyclone, and the great necessity for some system of storm signals by which *not only the shipping, but the whole population* may be warned of the approach of such visitations. Had such a system been in operation, much valuable property belonging to the trade and others might easily have been saved; or even had the notice been given to the Association which was forwarded to the Shipping by the Marine Authorities, a large number of the inhabitants could have been warned of the approach of the storm, and have been better prepared to meet it.

I am also directed by the Committee to state that the Association will gladly render any assistance it possibly can in the way of exhibiting from its Flag Staff, any code of signals which may be determined on by Government.

The Committee would also venture to enquire whether the time has not arrived for the construction of our underground Telegraph from Calcutta to Sandheads; the majority of heavy gales and Cyclones approach from Saugor, and past experience having shewn that the line of telegraph as at present used, is totally unable to withstand the effects of such visitations, it appears to the Committee of the utmost importance that communication should, if possible, be kept up, (at such times more especially) between Calcutta and the Sandheads, they therefore beg to recommend the construction of an underground telegraph, which would secure so great an advantage to the general public.

From H. L. HARRISON, Esq., Junior Secretary to the Government of Bengal, to the Secretary to the Meteorological Committee,—(No. 4689, dated Fort William, the 20th November 1867.)

In forwarding to you the accompanying copy of a letter dated the 15th instant, from the Secretary to the Calcutta Trades' Association, drawing attention to the want of a proper and efficient Meteorological Department in Calcutta, as evidenced during the late Cyclone, and the necessity for some system of Storm Signals by which not only the shipping but the whole population may be warned of the approach of such visitations. I am directed to request that the Meteorological Committee may be invited to state, for the Lieutenant-Governor's information, what notice was actually given, and at what hour to the shipping, and also in what manner, and by what means it was given, and whether there would be any difficulty in making the notice general for the benefit of the entire community.

2. I am at the same time desired to add, that the Lieutenant-Governor will be glad to receive any suggestions that the Committee may be prepared to offer for making the Meteorological Department more efficient.

From H. F. BLANFORD, Esq., Secretary to the Meteorological Committee, to the Junior Secretary to the Government of Bengal,—(No. 296, dated the 18th December 1867.)

I HAVE the honor to acknowledge the receipt of your letter No. 4689 of the 20th November, together with its enclosure, and having laid the same before the Meteorological Committee, I am requested to submit the following report in reply.

2. It has been the custom of the Meteorological Committee, ever since the date of its appointment, to communicate to the Master Attendant, warnings of the presumed or probable approach of storms, and that Officer has transmitted such warnings to the Shipping in the port, together with any directions that he may consider necessary.

3. This course was followed by the Meteorological Reporter on the occasion of the late Cyclone. On receiving, on the morning of the 1st November, the usual 10h. report from Saugor Island, and that of the previous afternoon from Cuttack, both showing a falling barometer and wind from the north-east, the storm quarter, the Reporter telegraphed to Saugor Island for an additional report at 12h. 30m. This report reached him about 2h. 30m. on his return from lecturing at the Presidency College. It shewed that the barometer had not fallen since the morning report more than is usual at that hour, but that the north-east wind was strong and unsteady, with scud from the north-east. This appeared to afford sufficient reason for warning the Shipping, and the Reporter states that he at once went over to the Master Attendant, saw him, and communicated to him personally the reports he had received, together with all other information that he was able to give; suggesting that the Shipping should be warned to be in readiness for bad weather: that he further explained how future telegrams should be interpreted on comparison with those already received; and as he had to attend a meeting at the Asiatic Society's rooms at 5 o'clock, he directed that a copy of the usual daily office report (containing the 16h. report from Saugor Island and Calcutta) should be sent to the Master Attendant in his absence. This was duly performed. He further states that he also telegraphed to Saugor Island for an additional report to be sent at 20h., and requested that a copy of this might be forwarded from the Electric Telegraph Office direct to the Master Attendant. Judging from the rate of progress of the storm of October 1864, and from the actual report and appearance of the weather at 4 o'clock, the proposed telegram at 20h. would, he considered, have sufficed for all practical purposes; but as the weather at Saugor Island became rapidly worse, the Observer, acting on Rule 3 of the Committee's Rules for registry and telegraphing, sent an additional report at 17h. 30m. which shewed a rapid fall of the barometer and increasing wind.

4. On receipt of this the Meteorological Reporter further states, that, after some delay in the attempt to procure a conveyance, he proceeded on foot to the 1st Assistant Master Attendant and reached him about 19h. 30m.: that he then informed him that there was every reason to believe that a severe storm was approaching, possibly a Cyclone, though the wind had shewn no sign of veering at Saugor Island. The Reporter thence proceeded to the Electric Telegraph Office, and there received another telegram despatched from Saugor Island at 19h., shewing that the barometer had fallen greatly, and that the wind was so violent that there was difficulty in reaching the barometer (in a room below the Electric Telegraph Assistant's dwelling room). This telegram was sent by peon to the 1st Assistant Master Attendant.

5. An attempt was made to obtain another report at 20h., but the reply was only partially intelligible, and a few minutes later the line ceased to work. Even in the latest report received, there was no sign of veering in the wind at Saugor Island, and nothing could, it appears to the Committee, be inferred with confidence as to the probable course of the storm.

6. In reply to the second question in your paragraph 1, I am instructed to state that the Committee feel that very great caution should be exercised in conveying any warning to the town generally; since such warning would most certainly create much alarm, while, if no storm of great violence should follow to justify the warning, there would be no compensating advantage, and discredit might be thrown on future warnings. A general warning might be conveyed to the town most speedily and effectually through the agency of the Police, but the Committee have grave doubts whether the

employment of such an agency would not give rise to an amount of alarm, which no probable benefit would justify. Moreover, the Committee is decidedly of opinion that no warning can ever be of any service in protecting the huts, &c., which from the bulk of the tenements of the northern or larger half of the town. With these remarks the Committee leave this point for the consideration and decision of His Honor.

7. With a view to meeting the requirements of Merchants, the Members of the Trades' Association, and others, who may have valuable property exposed to the weather, and which a timely warning might enable them to put under protection, the Committee would recommend that, (1) cautionary reports, such as that given to the Master Attendant on the afternoon of the 1st November, should be sent on occasions of threatening weather to the Chamber of Commerce, the Trades' Association, and some conspicuous building in Chowringhee (such as the Asiatic Society's building,) at which signal posts are or may be erected; also to the Newspaper Offices, to enable the Editors, if so disposed, to issue 'extra' notices to their Subscribers. (2.) That two forms of day signals be adopted, a black double cone and drum, (or triangular and square flags of the same color); the one to be used as a cautionary signal, the other to indicate the actual approach of a storm. These should be kept in readiness at each of the buildings specified, and hoisted on due notice given from the Meteorological Office. The Committee believe that the European public are sufficiently familiar with the idea of cautionary signals as distinct from danger signals, not to fall into the error of expecting a cyclone every time that the former are hoisted, and from the occasional non-occurrence of a storm on such occasions, to entertain a hasty distrust of the signals. Every pains should of course be taken to render the meaning of the signals familiar to the public beforehand.

(3). With reference to night signals there is some difficulty, and their utility for warning the town may be questioned. Rockets and fireworks of all kinds are too commonly used in Calcutta by the natives at feasts and marriages, to attract attention. Guns might be fired from the Fort, if the Military Authorities should raise no objection; but on the approach of Cyclones, the wind is always from north-east or East north-east, and such guns would scarcely be heard in most parts of Calcutta. Lamps to be employed according to the Fitzroy method, to indicate respectively the drum and the cone, could no doubt be kept in readiness at the Dock-yard, and might be hoisted on the mast thereto erected, but it appears doubtful how far such a mode of signalling could be depended on elsewhere than in large Government work-shops,—anywhere indeed, where the readiness and serviceable condition of the signals would depend in a great measure on the attention of native servants. And as at night time but little can be done towards putting property under protection; as, moreover, the alarm any night signals would give rise to, would be very great, and the occasions must be rare on which the cautionary signals could not be hoisted during some part of the day-light, the Committee would not venture to recommend at present the adoption of night signals, except for the warning of the Shipping. They would however recommend that night signals of the kind above specified be provided at the Dock-yard, and at some place higher up the river (*e. g.* the Bankshall, or other spot to be selected by the Master Attendant).

8. While the Committee admit that timely warning of storms may do much to avert losses of property on land, by enabling preparations to be made for securing it, they would at the same time point out that, as regards houses and property stored in houses, any warning will be of little value unless the owners or occupiers exert themselves to render the fastenings secure. The experience of the two great Cyclones that have visited Calcutta within the last four years, has shewn that, as a rule, the fastenings of windows are but little calculated to withstand the enormous strain to which they are subjected in these storms. And it must be observed that when one window in a building gives way and the wind has gained a free entrance, unless the wind be allowed to sweep through the house, the walls of the house or room are in the condition of the cylinder and piston of an Hydraulic press, and are forced outwards in all directions with a force of 30 or 40 lbs. and upwards on every square foot of wall surface. The provision of proper fastenings for windows,

although not strictly a matter within the functions of the Committee, is one to which they have given some attention, and the suggestions hereto appended may perhaps be found worthy of attention, especially in public offices, and places where valuable papers and other perishable property are stored.

9. In reply to His Honor's invitation of suggestions from the Committee, for making the Meteorological Department more efficient, the Committee would submit that a main object to be kept in view, is to consolidate as much as possible the work of the Department, and thus to obviate the possible confusion, delays, and errors arising from divided responsibility and want of uniformity in the system. The major portion of the Committee's recommendations are drawn up with this view.

10. Referring to the Committee's letter, No. 165 of 17th June 1867, the Committee would recommend that the first and second class stations therein enumerated be placed on the same footing as regards the supply of instruments and mode of registry, telegraphic reports being received from four stations only in Bengal as at present; the others to be registering but not telegraphing stations. At all these stations the system now adopted in Madras, under Mr. Pogson, may be introduced with advantage. Under that system, seventeen observing stations are established and provided with full sets of instruments. The observers are placed under the Meteorological Reporter. Trustworthy natives are selected and employed on a salary of Rupees 40 per month to make the observations, under the general superintendence of the Medical Officers who receive a fixed monthly allowance of Rupees 30 for carriage and superintendence. The returns are sent to the Superintendent, Mr. Pogson, who undertakes their publication in full, in an annual volume. On this portion of the Committee's recommendations they will report in more detail shortly.

11. With uniformity in the character of the stations, the adoption of uniform registers would be a concomitant reform, and one of very great importance. The Committee would indeed recommend that the same registry forms should be adopted for the whole of India. At the present time, in Bengal alone, and leaving out of consideration the proposed 3rd Class stations (for rainfall registration), the Medical Department issues Colonel James' forms, some adapted for monthly and others for weekly returns; a third form formerly issued by the Department and adapted for former observations, is still in use at some stations; a fourth drawn up by the Meteorological Reporter for the same stations is in store, but has not hitherto been employed; and a fifth form is in use for the stations established by this Committee. But this is not all, Colonel James' forms issued by the Medical Department are adapted for complete sets of instruments, duly compared and of uniform pattern. No single station possesses such instruments, and the returns are therefore very variously filled in. In the barometric column, for instance, are entered sometimes the readings of an aneroid, sometimes those of a mercurial barometer (instruments not comparable, *inter se*), and it is more frequently left blank. It is almost superfluous to remark that by such diversity in the returns, great additional work is imposed on the office in which it is endeavoured to reduce the observations, and calculate their means. But hitherto this has not been attempted, except in the case of the Committee's stations, and the rainfall of other stations, partly because the Reporter's Office is at present inadequate to this additional work, and partly for the reasons specified in paragraph 13.

12. In order to render the observations uniform at the present 1st and 2nd Class Stations, barometers would be supplied to the latter, and maximum and minimum thermometers, with thermometer sheds to the former. It may also be desirable to furnish additional instruments to both, *viz.*, vacuum black bulb thermometers for solar radiation, minimum radiation thermometers for grass, earth thermometers, anemometers and evaporation gauges. This, however, would involve no very great expense, and the outlay would be incurred once for all.

13. In previous reports the Committee have uniformly insisted most strongly on the great importance of all instruments being subjected to a thorough testing previously to their being issued, a record of the instrumental errors being made and preserved for office use. This has not been done so far as the Committee are aware in the case of most, if indeed of any, of the instruments, the readings of which are now recorded by the District Meteorological

Officers. It is impossible therefore to know what is the relative value of the readings of the instruments employed, while it may safely be assumed that the indications of some of them are so far erroneous as not to be susceptible of comparison. It is impossible to say which instruments are trustworthy or whether any are, and in this uncertainty it has been felt that it would be throwing away labour to attempt to reduce and abstract their readings. The instruments issued by the Committee have indeed all been compared with standards, but, in the opinion of the Committee, the tests applied are insufficient, and the comparison has not been satisfactory, because the means do not at present exist in Calcutta of carrying out such tests for any but standard barometers.

14. The Committee consider that conformably to their preliminary postulate, *viz.*, that responsibility should be undivided, the Meteorological Reporter should be entrusted with the testing of all instruments issued to the observers whose registers he receives and discusses, and that he be provided with the means of subjecting these to satisfactory and sufficient tests, and comparison with standards to be kept and observed in his own office or at the Meteorological Observatory, if the site be near his office, as proposed in paragraph 10. This is the course followed and sanctioned at Madras. The apparatus required for testing thermometers is very simple and inexpensive. Standard and mountain barometers require no apparatus beyond a scale for testing their graduation; but marine barometers and the ordinary storm barometers should be tested in an exhausted receiver, similar to that which has now been habitually used at the Kew Observatory for the same purpose for the last four years. The Committee would recommend that the Meteorological Reporter be furnished with all requisite apparatus. No special establishment would be requisite for the testing, as writers and computers of good average intelligence would easily perform the work, in conjunction with the Reporter himself.

15. Another measure which the Committee would most strongly recommend to Government, is that the Meteorological Observatory be established in some clear space not surrounded by buildings, the effect of which is greatly to influence the thermometric and hygrometric readings, while the necessity of erecting the anemometer and wind-vane on the summit of a lofty building (the other instruments being placed in a shed on the ground), practically removes the former from the eye of the observer. For a site, the Committee would suggest some place on the fortifications of Fort William, or in case any objection be raised to this by the Military Authorities, some place on the maidan. A small building only would be required for the purpose. If not in the Fort, the site should be as near as possible to the Office of the Meteorological Reporter; otherwise he should be furnished at his office with a set of standard instruments for observation, and for the comparison of the instruments issued by him at all times. The absence of any means of observation at or near his Office, was felt to be a great inconvenience on the occasion of the late Cyclone. He has since indented for a barometer, but it appears very desirable to the Committee that he should be provided with the means for more complete observation, as well as of verification of the instruments, the registers of which he receives and discusses.

16. The above measures will, the Committee believe, render the Meteorological Department very much more effective, by placing the administration more in the hands of one Officer and so concentrating responsibility; by ensuring a degree of accuracy and reliability to the records of observation which they have never hitherto attained; and by removing existing causes of delay in the communication of urgent information to the Meteorological Reporter and of warnings from him to the Shipping and mercantile public.

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From H. L. HARRISON, Esq., Junior Secretary to the Government of Bengal, to the Secretary to the Meteorological Committee.—(No. 372, dated the 20th January 1868.)

I AM directed to acknowledge the receipt of your letter No. 296, dated 18th ultimo, and in reply to communicate the following observations on the measures proposed by the Committee for the establishment of an efficient system of storm signals for the Town and Shipping

of Calcutta, and for increasing generally the efficiency of the Meteorological Department.

2. The Lieutenant-Governor admits the force of the objections adduced in your 6th paragraph, to using the agency of the Police in conveying warnings of impending storms, as well as against needlessly alarming the town in general in cases where the event will frequently fail to justify such alarm ; he, therefore, concurs in the propriety of limiting the warnings of the Committee as suggested in paragraph 7. The Meteorological Department should, accordingly, for the future, send notices of threatening weather, whenever the occasion may arise, to the Chamber of Commerce, the Trades' Association, and to some conspicuous building in Chowringhee, (the Asiatic Society's premises, if no objection is raised,) where signal posts might be erected, and a code of signals of the description recommended be adopted. The same reports should be furnished likewise to the Editors of the leading daily papers in Calcutta, to enable them (if they think fit) to issue extra notices to their subscribers.

3. This code of signals will, it is hoped, keep the general public sufficiently informed, during the day time, either of the possibility or of the immediate imminence of a severe storm, as the case may be ; and in regard to night signals, His Honor concurs with the Committee in the opinion that little or no advantage would accrue to the public in general by their adoption. It will, therefore, be sufficient if lamps ready prepared for night signals are kept at the Dock-Yard and at the new Bankshall, for the information of the Shipping.

4. *Paragraphs 9 and 10.*—The Lieutenant-Governor understands that a further and more detailed report may be expected from the Committee on the subject treated of in these two paragraphs.

5. *Paragraph 11.*—In order to remedy the want of uniformity in the forms of returns now in use, the Meteorological Committee should, in communication with the Inspector-General of Hospitals, make arrangements for the preparation and circulation of a uniform set of forms of Registers to be used at all observing stations. As the Inspector-General of Hospitals has been made an ex-officio Member of the Committee, no difficulty will probably be experienced in effecting this, and the Lieutenant-Governor hopes that no further complaints of the inconvenience arising from the want of uniformity will be necessary.

6. *Paragraph 12.*—The Lieutenant-Governor is prepared to sanction any moderate outlay for the purpose of supplying additional instruments for observing stations. A specific proposal, with estimate of cost, should be submitted for approval and sanction.

7. *Paragraph 14.*—Similarly, an estimate for the requisite apparatus for testing marine and storm barometers should be submitted. Sanction to the testing by the Meteorological Reporter of all thermometers hereafter to be issued has been already given in paragraph 2 of my No. 2721, dated 8th July 1867, and the Lieutenant-Governor now approves of your further proposal to have all other instruments, as opportunity offers, tested by the same Officer.

8. *Paragraph 15.*—The Lieutenant-Governor will be glad to learn whether the roof of the new Bankshall would be a proper place for the Meteorological Observatory. There would be many advantages in adopting it, but if the contiguity of other buildings is a fatal objection to its selection, the Committee should propose some other spot for approval.

Results of the Meteorological Observations taken at the Surveyor-General's Office, Calcutta, from 15th to 21st January 1868.

MONTH.	Date:	Reduced Reading of Barometer at 10 A. M.				THERMOMETER.		Mean Temperature for the day.	Mean Wet Bulb.	Computed Mean Dew-point.	Mean Degree of humidity for the day.	Prevailing Direction of Wind during the day.	Rain.	Max. Pressure of Wind.	GENERAL REMARKS
		Inches.	Highest Reading.	Lowest Reading.	Daily Range of the Temperature.										
Jan. ...	15th	80.198	70.4	60.5	10.9	67.9	60.0	53.7	0.63	N	...	...	...	Clear.	
	16th	.164	75.4	59.5	15.9	68.9	59.7	53.9	.65	N	...	...	...	Clear.	
	17th	.109	78.0	60.4	15.6	68.6	60.3	55.3	.69	N	...	...	...	Clear. Slightly foggy at 2 and 3 A.M.	
	18th	.083	76.5	58.8	17.7	67.0	60.0	53.5	.64	N	...	...	...	Chiefly clear.	
	19th	.126	78.7	60.5	16.2	69.2	61.0	55.2	.65	N	...	...	...	Chiefly clear.	
	20th	.151	77.2	61.6	15.6	68.8	61.8	50.2	.66	N	...	...	...	Chiefly clear.	
	21st	.166	76.2	59.2	17.0	67.4	69.4	53.0	.62	N & N E	...	...	...	Clear.	

The mean Temperature and the mean Wet Bulb are derived from the twenty-four hourly Observations made during the day.

The Dew-point is computed with the Greenwich constants. The figures in column ten represent the humidity of the air, the complete saturation of which being taken at unity. The receiver of the lower rain gauge is 1 foot 2 inches, and that of the Anemometer 70 feet 10 inches, above the level of the ground.

The extreme variation of Temperature during the past seven days	...	18.4
The Max. Temperature during the past seven days	...	77.2
The Max. Temperature during the corresponding period of the past year	...	82.4
The mean humidity during the past seven days	...	0.65
The mean humidity during the corresponding period of the past year	...	0.68
The total fall of rain from 15th to 21st... { by lower rain gauge		Inches.
Ditto ditto from 15th to 21st, average of fourteen previous years	...	Nil.
Ditto ditto between the 1st January and the 21st current	...	Nil.
Ditto ditto during the corresponding period of the past year	...	0.05

The 24th January 1868.

**GOPEENAUTH SEN,**  
*in charge of the Observatory.*

## Meteorological Report up to 14th January 1868.

STATION.	January.	Hour.	Barometer reduced to 32°.	THERMOMETER.		Humidity Sat. = 101.	WIND.		Rain.	WEATHER
				Dry.	Wet.		Direction.	Velocity.		
CALCUTTA.			Inches.	Θ	Θ					Inches.
	8th	10	30.120	71	62	57	N	...	...	Clear.
		16	29.988	75	63	47	N by E	...	...	Scattered cirri.
	9th	10	30.077	68	59	55	N	...	...	Clear.
		16	29.950	74	62	47	N	...	...	Ditto.
	10th	10	30.111	68	58	51	N	...	...	Ditto.
		16	29.972	74	61	43	N W	...	...	Scattered cirrocumuli.
	11th	10	30.106	66	59	63	N N W	...	...	Ditto ditto.
		16	30.030	74	60	39	N N	...	...	Ditto ditto.
	12th	10	30.177	68	61	64	N by W	...	...	Scattered cirrostrati.
		16	30.037	75	64	51	N	...	...	Cirri.
	13th	10	30.184	70	63	63	N N E	...	...	Strati.
		16	30.068	75	64	51	N	...	...	Clear.
	14th	10	30.171	71	64	66	N	...	...	Ditto.
		16	30.058	77	65	49	N by E	...	...	
SARSON ISLAND.										
	8th	9-30	30.044	71	64	66	N by E	Moderate	...	Ditto.
		16	29.960	76	67	60	N	Moderate	...	Light clouds.
	9th	9-30	30.021	67	62	74	N E	Light	...	Clear.
		16	29.928	76	65	52	N	Tight	...	Ditto.
	10th	9-30	30.031	67	61	69	N by E	Moderate	...	Ditto.
		16	29.951	76	65	52	N by W	Light	...	Scattered clouds.
	11th	9-30	30.080	65	60	73	E	Light	...	Light clouds.
		16	30.014	74	64	55	N	Moderate	...	Scattered clouds.
	12th	9-30	30.118	65	61	78	N	Light	...	Clear.
		16	30.013	75	65	65	N	Light	...	Cloudy.
	13th	9-30	30.126	66	63	83	Calm	...	...	Ditto.
		16	30.155	74	66	63	N by W	Light	...	Light clouds.
	14th	9-30	30.101	68	64	70	N	Light	...	Hazy.
		16	30.029	76	69	68	N	Light	...	
CHITTAGONG.										
	8th	9-30	29.951	68	66	89	N	Light	...	Heavy towards N. and E.
		16	29.871	73	68	76	W	Light	...	Hazy.
	9th	9-30	29.932	66	60	68	S W by W	Light	...	Ditto.
		16	29.814	68	62	69	W	Light	...	Ditto.
	10th	9-30	29.957	63	59	77	E S E	Light	...	Ditto.
		16	29.864	67	63	79	S W	Light	...	Ditto.
	11th	9-30	29.906	64	61	83	N N E	Light	...	Clear than usual but still hazy.
		16	29.932	68	64	79	W by S	Light	...	Hazy.
	12th	9-30	30.025	64	62	88	N by E	Light	...	Cloudy horizon.
		16	29.931	72	68	80	S W	Light	...	Cloudy.
	13th	9-30	30.020	66	64	89	S E	Light	...	Heavy towards N. E. & S. E.
		16	29.939	70	66	79	S W by W	Light	...	Cumulostrati.
	14th	9-30	30.037	67	65	89	N	Light	...	Cirrocumuli.
AKTAN.										
	8th	9-30	30.021	69	67	89	N E	Light	...	Fine.
		16	29.895	79	70	61	N W	Moderate	...	Ditto.
	9th	9-30	29.957	67	63	79	N N W	Moderate	...	Cirrite.
		16	29.876	75	68	68	W N W	Moderate	...	Fine.
	10th	9-30	30.000	62	58	77	N	Moderate	...	Chilly morning with fresh northerly breeze.
		16	29.923	74	65	59	W	Light	...	Fine and pleasant.
	11th	9-30	30.073	67	65	89	N E	Light	...	Ditto ditto.
		16	29.970	77	68	60	W	Light	...	Ditto ditto.
	12th	9-30	30.071	69	66	84	E	Moderate	...	Ditto ditto.
		16	29.980	77	72	77	W S W	Light	...	Ditto ditto.
	13th	9-30	30.106	71	67	80	N E	Light	...	Ditto ditto.
		16	29.930	77	70	68	W	Light	...	Cloudy.
	14th	9-30	30.058	70	68	89	N E	Light	...	Fine.
CUTTACK.										
	8th	9-30	30.127	72	66	71	N E by E	Moderate	...	Thin cirri and misty.
		16	30.018	75	65	55	E by S	Light	...	Ditto and misty horizon.
	9th	9-30	30.120	71	67	80	E by N	Light	...	Scattered cirri, cirrostrati to S. W. and hazy.
		16	29.921	77	68	60	W by N	Light	...	Thin cirri to S. E. cirrostrati to N. E. and cumuli to N.
	10th	9-30	30.111	73	68	76	N E by E	Light	...	Scattered cirri, and cirrostrati.
		16	29.938	78	66	49	N W by N	Light	...	Thin cirri and comuli.
	11th	9-30	30.106	72	67	75	N E by E	Light	...	Cirri, cirrostrati, cumuli and hazy.
		16	29.921	77	68	60	N E by E	Light	...	Thin cirri and fine.
	12th	9-30	30.111	73	68	76	E	Light	...	Light cirri and hazy.
		16	30.060	77	62	38	E by N	Light	...	Cirri and misty horizon.
	13th	9-30	30.192	69	63	70	E by N	Light	...	Cirrostrati & partially cloudy.
		16	30.095	76	64	48	N by E	Light	...	Cirrostrati, circumuli, cirri and cloudy.
	14th	9-30	30.192	70	64	70	N E	Light	...	Cirri overhead & misty horizon.
MADRAS.										
	8th	10	30.050	82	70	52	E N E	5°	...	A speck of light cirri to S. W. cluster of cirri to N. & misty horizon.
		16	29.923	81	70	55	N E	11°	...	Passing clouds.
	9th	10	30.041	82	75	70	E N E	10°	...	Fine.
		16	29.951	81	70	56	N E	12°	...	Fine with light clouds.
	10th	10	30.050	80	70	58	E N E	5°	...	Cloudy.
		16	29.922	81	72	62	E by N	8°	...	Fine.
	11th	10	30.080	82	72	59	N E	9°	...	Ditto.
		16	29.953	81	72	62	E	12°	...	Passing clouds.
	12th	10	30.088	83	70	49	N E	15°	...	Light clouds.
		16	29.979	80	70	58	N E	15°	...	Fine with light clouds.
	13th	10	30.096	83	73	60	N E	19°	...	Ditto ditto.
		16	29.974	80	72	66	N N E	16°	...	Ditto ditto.
	14th	10	30.080	82	74	66	N E	12°	...	Passing clouds.
		16	29.961	82	74	66	N E	15°	...	

Station.	January.	Hour.	Barometer reduced to 32°.	THERMOMETER.		Humidity Sat. = 100.	WIND.		Rain.	REMARKS	
				Dry.	Wet.		Direction.	Velocity.			
BENARES.	8th	10	Inches.	Θ	Θ				Inches.		
	16	29°912	62	61	41	S W	Moderate	...	Cirri, Strati.		
	9th	10	29°827	65	53	39	W	...	Cumuli strati.		
	16	29°888	61	64	60	W	Moderate.	...			
	10th	10	29°787	71	57	36	W	Strong	...	Strati.	
	16	29°878	65	55	48	W					
	11th	10	29°916	68	57	36	N W	Moderate			
	16	29°844	72	59	41	E	Light	...	Cirrocumuli strati.		
	12th	10	29°944	63	59	55	N E	...	Strati.		
	16	29°862	66	60	68	N W	...		Cirrocumuli.		
	13th	10	29°959	62	60	88	E	...	Cumuli, strati.		
	16	29°884	70	65	75	N E	Light	...	0°09 Ditto.		
	14th	10	29°969	62	60	88	S W	Light	...	Ditto.	
	16	29°892	71	60	49	N W	Light.	...	Cirrocumuli.		
DACCAL.	8th	9-30	29°989	66	58	N	Light	...	Partially cloudy.		
	16	29°982	60	61	60	W	Light	...	Ditto.		
	9th	9-30	29°952	65	59	68	N N W	Light	...	Clear.	
	16	29°837	67	60	64	N N W	Light	...	Ditto.		
	10th	9-30	30°050	66	60	68	N	Light	...	Ditto.	
	16	29°857	67	61	69	W	Light	...	Ditto.		
	11th	9-30	30°019	68	62	78	N N W	Light	...	Ditto.	
	16	29°924	68	62	69	N N W	Light	...	Partially cloudy.		
	12th	9-30	30°012	65	63	89	N	Light	...	Clear.	
	16	29°902	71	62	57	N E	Light	...	Partially cloudy.		
	13th	9-30	30°031	68	62	69	N W	Light	...	Ditto.	
	16	29°905	71	68	85	N N W	Light	...	Ditto.		
	14th	9-30	30°034	68	64	79	N N W	Light	...	Ditto.	
	16	29°903	72	65	66	N N W	Light	...	Clear.		
DARJEELING.	8th	9-30	23°273	40	40	100	E S E	Light	...	Misty.	
	16	23°214	41	39	82	S E by E	Light	...	Ditto.		
	9th	9-30	23°244	40	38	82	S E	Light	...	Ditto.	
	16	23°200	41	40	91	W	Light	...	Ditto.		
	10th	9-30	23°290	41	39	82	S E	Light	...	Scattered cumuli, frosty morning.	
	16	23°238	48	44	70	N W	Light	...	Cirrocumuli.		
	11th	9-30	23°370	43	42	91	S S E	Light	...	A few thin clouds only. Frosty morning.	
	16	23°269	49	44	63	S E	Light	...	Scattered cumuli, rather heavy to S.		
	12th	9-30	23°410	43	40	75	E	Light	...	Clear sky. Frosty morning.	
	16	23°328	53	46	51	W	Light	...	Covered with beautiful cirri.		
	13th	9-30	23°409	43	42	91	S W	Light	...	Misty.	
	16	23°342	45	44	92	W	Light	...	Ditto.		
	14th	9-30	23°376	46	42	60	E by N	Light	...	Clear sky.	
	16	23°323	54	47	55	N W	Light	...	Cumuli round horizon, and rather hazy.		
ROORKEE.	8th	9-30	29°170	58	52	64	S W	...	...		
	16	29°121	68	55	38	S W	...	...			
	9th	9-30	29°158	58	51	58	S W	...	...		
	16	29°060	67	64	37	N W	...	...			
	10th	9-30	29°156	53	48	66	Calm	...	...		
	16	29°081	64	55	63	Calm	...	...			
	11th	9-30	29°234	57	61	63	Calm	...	...		
	16	29°174	65	54	44	Calm	...	...			
	12th	9-30	29°217	68	56	42	S W	...	...		
	16	29°153	71	57	38	S W	...	...			
	13th	9-30	29°286	61	63	55	Calm	...	...		
	16	29°234	69	50	39	S W	...	...			
	14th	9-30	29°252	61	53	55	Calm	...	...		
	16	29°186	69	66	39	S W	...	...			
FAREWELL POINT.	5th	9-30	30°011	69	67	89	W	...	...	Light weather.	
	16	29°878	74	71	85	S	...	...	Light wind and clear.		
	6th	9-30	30°001	69	67	89	S W	...	...	Ditto ditto.	
	16	29°978	74	71	85	S	...	...	Ditto ditto.		
	7th	9-30	29°981	73	69	80	S W	...	...	Light airs and clear.	
	16	29°898	74	71	85	S	...	...	Ditto weather.		
	8th	9-30	30°033	72	70	90	N E	...	...	Light winds and fine.	
	16	29°931	73	69	80	E	...	...	Ditto weather.		
	9th	9-30	30°06	71	68	85	E	...	...	Ditto ditto.	
	16	29°881	73	70	85	S E	...	...	Ditto ditto.		
	10th	9-30	29°991	73	69	85	Variable	...	...	Light airs and fine.	
	16	29°898	74	69	76	E	...	...	Ditto winds and fine.		
	11th	9-30	30°040	73	68	76	N E	...	...	Ditto weather.	
	16	29°963	73	67	75	E	...	...	Ditto ditto,		

**Abstract of corrected Observations as received in the Meteorological Reporter's Office.**

DECEMBER 1867.

HOURS OF OBSERVATION 10 AND 16.

*N. B.*—The Barometric data are reduced for temperature, not for height, above sea level.

STATIONS.	10 HOURS.								16 HOURS.								MEANS FOR THE MONTH.				Rain. Inches.
	Max. Ther.	Date.	Min. Ther.	Date.	Max. Bar.	Date.	Min. Bar.	Date.	Max. Ther.	Date.	Min. Ther.	Date.	Max. Bar.	Date.	Min. Bar.	Date.	Baro- meter.	Dry.	Wet.	Humid- ity.	
Calcutta ...	75°	4th	66°	14th	30°201	1st	30.088	7th	78°	4th	72°	25th	30°071	1st	29°961	7th	30°088	72°	63°	57	Nil.
Sangor Island	73°	3rd	66°	30th	30°145	1st	30.029	20th	78°	27th	73°	31st	30°079	1st	29°950	7th	30°048	72°	65°	66	Ditto.
Chittagong A.	71°	4th	63°	31st	30°044	1st	29.930	7th	75°	4th	68°	31st	29°958	1st	29°830	7th	29°914	69°	66°	84	Ditto.
Akyab ...	71°	5th	66°	29th	30°130	1st	29°979	7th	78°	28th	73°	11th	30°022	1st	29°873	7th	30°010	73°	69°	79	Ditto.
Cuttack ...	74°	30th	65°	23rd	30°235	1st	30°138	7th	77°	29th	71°	6th	30°151	1st	29°984	20th	30°124	72°	63°	58	Ditto.
Madras ...	61°	8th	75°	26th	30°125	1st	30.013	7th	80°	24th	73°	3rd	30°018	1st	29°927	25th	30°030	78°	70°	65	253
Dacca ...	74°	4th	66°	30th	30°066	1st	29°976	7th	73°	19th	68°	31st	29°981	17th	29°876	7th	29°978	70°	65°	75	Nil.
Darjeeling ..	61°	1st	39°	15th	23°487	1st	23°312	28th	55°	17th	43°	15th	23°411	18th	23°244	7th	23°318	48°	44°	70	Ditto.
False Point	74°	8th	67°	22nd	30°162	2nd	30°036	7th	76°	8th	70°	19th	30°050	1st	29°935	7th	30°040	71°	65°	70	Ditto.
Benares ...	73°	4th	52°	31st	30°019	1st	29°889	21st	79°	4th	60°	31st	29°936	4th	29°777	25th	29°901	69°	61°	69	Ditto.
Roorkee ..	69°	5th	49°	29th	29°313	18th	29°165	16th	76°	3rd	65°	30th	29°226	17th	29°816	25th	29°198	65°	65°	53	0.87

BENGAL SECRETARIAT,  
The 25th January 1868.

HENRY F. BLANFORD,  
*Meteorological Reporter to Govt. of Bengal.*



SUPPLEMENT TO  
**The Calcutta Gazette.**

WEDNESDAY, FEBRUARY 5, 1868.

**OFFICIAL PAPERS.**

*Non-Subscribers to the GAZETTE may receive the SUPPLEMENT separately on a payment of six Rupees per annum if delivered in Calcutta, or twelve Rupees if sent by Post.*

**Report on the Cultivation of Cinchona at Darjeeling, during the month of October 1867.**

From T. ANDERSON, Esq., M. N., Superintendent, Botanical Gardens, and in charge of Cinchona Cultivation in Bengal, to the Junior Secretary to the Government of Bengal,—(No. 110, dated Botanical Gardens, the 14th January 1868.)

I HAVE the honor to forward the Report on the cultivation of Cinchona at Darjeeling, during the month of October 1867.

*Report on the cultivation of Cinchona at Darjeeling, during the month of October 1867.*

THE operations during the month consisted of cutting the jungle around the plants in the permanent plantations, and of opening up the soil around the plants. 75,000 plants were transferred to the open air nursery beds. The increase by cuttings during the month amounted to 85,000 plants.

The weather was warm and comparatively dry, and only 6.05 inches of rain fell during the month.

*Table shewing the temperature of the month at the different plantations.*

PLANTATIONS.	Mean Maximum.	Mean Minimum.	Mean Temperature.	REMARKS.
2nd Plantation ...	64.9	54.0	59.4	
3rd Ditto ...	68.9	55.3	62.1	
4th Ditto ...	76.7	55.5	66.1	
5th Ditto ...	84.87	59.12	72.0	

Table shewing the maximum and minimum growth during the month of October 1867.

NAMES OF SPECIES.	TEESTA.		RUNGBEE.		
	First Plantation.	Second Plantation.	Third Plantation.	Fourth Plantation.	Fifth Plantation.
C. Succirubra ..	1 $\frac{1}{4}$ to 4 ins.	1 $\frac{1}{2}$ to 4 $\frac{1}{4}$ ins.	Not measured.	1 to 6 $\frac{1}{2}$ ins.	2 to 8 $\frac{1}{4}$ inches.
C. Micrantha ..	1 to 7 $\frac{1}{2}$ "	2 to 8 "	Ditto.	3 $\frac{1}{2}$ to 6 $\frac{1}{2}$ "	3 to 8 $\frac{1}{4}$ "
C. Officinalis ..	Not measured.	Not measured.	4 to 3 inches.	4 to 5 $\frac{1}{2}$ "	4 to 3 "
C. Pahudiana ..	Ditto.	Ditto.	Not measured.	2 $\frac{1}{2}$ " 2 $\frac{1}{2}$ to 6 $\frac{1}{2}$ "	2 $\frac{1}{2}$ to 6 $\frac{1}{2}$ "

Number and Distribution of Cinchona Plants in the Government Plantations at Rungbee on the 1st November 1867.

NAMES OF SPECIES OF CINCHONA.	Number in permanent Plantations.	Number of stock plants for propagation.	Number of seedlings or rooted cuttings in Nursery Beds for Permanent Plantations.	Number of rooted plants in Cutting Beds.	Number of cuttings made during the month.	Total number of plants, cuttings, and seedlings.
C. Succirubra ..	2,50,828	20,000	1,51,210	1,67,299	54,000	6,43,337
C. Calisaya ..	150	2,260	None.	5,844	1,000	9,254
C. Micrantha ..	5,558	1,000	7,120	16,989	None.	30,667
C. Officinalis and Varieties ..	1,30,919	10,000	1,97,476	2,61,513	30,000	6,29,908
C. Pahudiana ..	5,092	None.	None.	None.	None.	5,092
Total ..	3,92,547	33,260	3,55,806	4,51,645	85,000	12,18,258

J. GAMMIE,  
Head Gardener in Charge.

**TABLE** showing the growth of *Cinchona* in the Teesta and Rungles Plantations, during the month of October 1887.

T. ANDERSON, M. D.,

*Superintendent of the Botanical Gardens,  
and in charge of Cinchona Cultivation in Bengal.*

### Progress of Irrigation in the Cuttack Division.

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From T. E. RAVENSHAW, Esq., Officiating Commissioner of the Cuttack Division, to the Secretary to the Board of Revenue, Lower Provinces,—(No. 264, dated Camp Keonjurgur, the 10th December 1867.)

I HAVE the honor to submit, in original, correspondence and documents received with Cuttack Collector's No. 597, dated 2nd December 1867, shewing the progress made in irrigation. The results though not brilliant are on the whole satisfactory, as shewing errors in cultivation detected and causes of failure ascertained, not only by the Revenue and Irrigation Company's Officers, but by the people themselves.

2. A Special Superintendent of Irrigation has been appointed by the Company, whose entire attention will be devoted to the subject, and from the excellent understanding and cordiality, which appears to exist between Government officials and the Irrigation Company's Officers, I am led to believe that no pains will be spared and no means left untried, to disseminate practical information among the people, and to induce them to ascertain for themselves, by actual experiment, the advantages they may expect to obtain by adopting systematic irrigation.

3. The continued indifference exhibited by landed proprietors can only be overcome by time and patience, and I do not think much direct influence or action can be expected from them. They are as a body exceedingly averse to the introduction of anything new, or any change in the immemorial customs of the country and system of agriculture. They have but little independence and an intense objection to come forward and start any new project. In conversations with landed proprietors, I have often been met by the following objection to irrigation:

1st.—I do not believe it will pay, or that two crops can be obtained from the same land.

2nd.—I will have no objection to take water and to use every influence to induce my ryots to take water, if every other Zemindar will do the same. Each individual hesitates in the same manner, and it takes a long time to induce united action.

4. From my knowledge of the feelings and habits of the people of Orissa of all classes, I believe the commencement and progress already made in irrigation, is as favorable on the whole, as could be expected; and that it only requires time to develop itself. As soon as a few individual ryots have been tempted to try the experiment and have succeeded, others will do the same, and the small beginning already made is an earnest of better things. As soon as individual ryots here and there succeed, numbers will follow their example; Zemindars will gradually find their fears of deterioration of the land, unfounded. Those who have taken irrigation water will be in a position to pay their rents with greater regularity. By degrees Zemindars will, like their ryots, cease to have any doubt of success, and ere long become anxious to promote irrigation as they are now indifferent to its use.

5. I quite agree with the Deputy Collector that there is no active opposition on the part of Zemindars, and that their prejudices and indifference will be gradually overcome.

6. The measures adopted by the Irrigation Company in offering a bonus to such ryots as may succeed in rearing the best crops, appear judicious; but I should, at the same time, like to see a few more experimental farms taken in hand by the Company, as I feel assured that any extra expenditure on this account, would be small in comparison with the results. I have communicated these views to the local Agent and Manager, and I trust the Company may be induced to repeat the experiment of last year, which only failed through insufficient attention to ordinary selection of seed and land, which, with the experience now gained, should not recur.

7. I am happy to observe that the Company have not pressed for water rates, on lands which failed either through inability of the Company to supply a full amount of water, or through ignorance of the people in applying it when supplied. This will do much towards gaining confidence of the people, who are beginning to regard the Company's operations with favor. The late famine has not been without its results in giving confidence in the Company's Officers, as large employers of labor, which has been the means of preserving a large number of the population. The Company's Officers have been most assiduous in supervising work done, in prompt payment, and in preserving the laborers from extortion on the part of contractors. All these circumstances have combined to induce a degree of confidence, which cannot be without its ultimate results in the spread of irrigation.

8. I am happy to observe a disposition to extend cotton cultivation and the improvement in the yield and also in the staple, of produce is a subject which cannot be too carefully attended to. The measures taken in issuing a notification, shewing results of experiments at Nagpore, are judicious. I have directed the Irrigation Deputy Collector to use every influence, carefully and persistently, in communication with the people to disseminate information regarding the modes of cultivation, and to keep a careful record of the results of any experiments that may be taken in hand, either by the Irrigation Company direct, or by the people, and to endeavour to utilize the results by giving them the widest possible publication.

9. In forwarding the correspondence in original, I have the honor to request its return, and if considered worth printing as a record of progress in Orissa, I shall be obliged by a few copies for distribution.

From W. MACPHERSON, Esq., Collector of Cuttack, to the Commissioner of the Cuttack Division,—(No. 597, dated the 2nd December 1867.)

I HAVE the honor to forward for your perusal, a report, No. 41 of the 1st November, from the Deputy Collector employed in the collection of water rates, shewing the progress made up to date in registering leases, and collecting the dues, &c., &c.; also a letter with annexures from Mr. Boothby, on the same subject.

2. Mr. Boothby's attention was called to the delay in submitting leases for registration, which of course retarded the collections. The appointment of Mr. Roberts and the clearing off of arrears, will obviate such delay in future.

3. All claims in cases where the Company failed to supply water, will be struck off.

4. The return of all enclosures is requested when done with.

From BABOO WOOMA CHURN HALDAR, Deputy Collector, to the Collector of Cuttack,— (No. 41, dated Cuttack, the 1st November 1867.)

I HAVE the honor to submit the following report on irrigation in Cuttack.

2. No leases have yet been received from the High Level Canal. Those of the last year from the Kendraparab Canal came in as follows:—

No. of leases.		Dates of receipts.
89	...	... 8th June
97	...	... 21st ditto
153	...	... 22nd ditto
82	...	... 24th ditto
54	...	... 25th ditto
145	...	... 26th ditto
26	...	... 1st July
455	...	... 26th September.
<b>Total</b>	<b>... 1,101.</b>	

3. From the above it will be seen that the leases were sent in with great irregularity, for which I could not make any demand of water rates earlier than August. As the leases received during June and July had to be registered together, and the registration could not be finished till the end of July. The cause of this irregularity in the despatch of the leases by the Company's Overseer, with whom they remained was, as I have understood, the protracted ill-health of that Officer from April, and that in many cases the leases had to be revised to be fit for registration, according to the rules. The leases being on old forms, and formerly executed, several items had been omitted to be filled in. I hope that in future the leases will be sent in punctually and properly filled up. The recent appointment of a Superintendent of Irrigation Works on the Company's behalf is, I doubt not, a good guarantee against any irregularity henceforth. It is very necessary for convenience of my business to save time and labor, and for other obvious reasons, that the leases should be sent in as soon as executed or weekly. The old leases, coming in by batches, after long intervals, kept my Mohurirs sometimes quite unemployed, and at others overburdened them with work. Then again I regret for the last batch coming in so late as September. Had it been received together with the others, the collection of rates due could have been better made at the same time.

4. The first demand of rates was for Rupees 1,362-2, of which Rupees 554-14 have been realized. The sum of Rupees 1,362-2 also included many cases, in which, as I found on enquiry, no water could be given or any was taken, though the leases in such cases have not been cancelled by the Company's Overseer; and the cultivators generally had received promises of remission of water rates from the Company's Officers in case of failure of the crops. Under these circumstances, and considering the general loss of crops during the last year, I think the collection is fair, and as reflecting much credit on the good character of the ryots, of whom those that made even a partial gain, paid up their dues with alacrity. The next demand to follow soon is for Rupees 1,161-5-5.

5. The total number of leases received from the beginning to the end of the quarter expiring with last September, for which according to the remarks of the Company's Overseer noted on the leases, water was given at 411 for 667 acres 21 goonts 13 biswas, the water rates amounting to Rupees 2,523-7-5; 592 is the number of leases for 1,505 acres 21 goonts 12 biswas, for which water could not be given, the rates being Rupees 4,638-9-8; and those contracted for at the rate of cubic yards, for which water could not or was not taken,